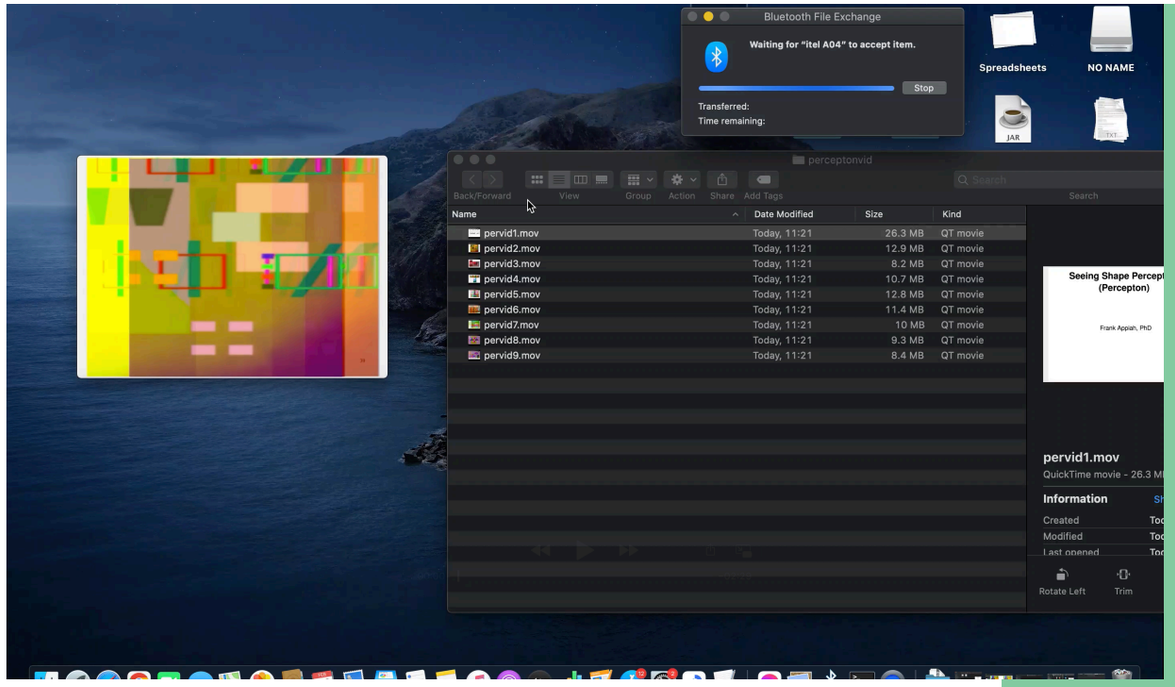


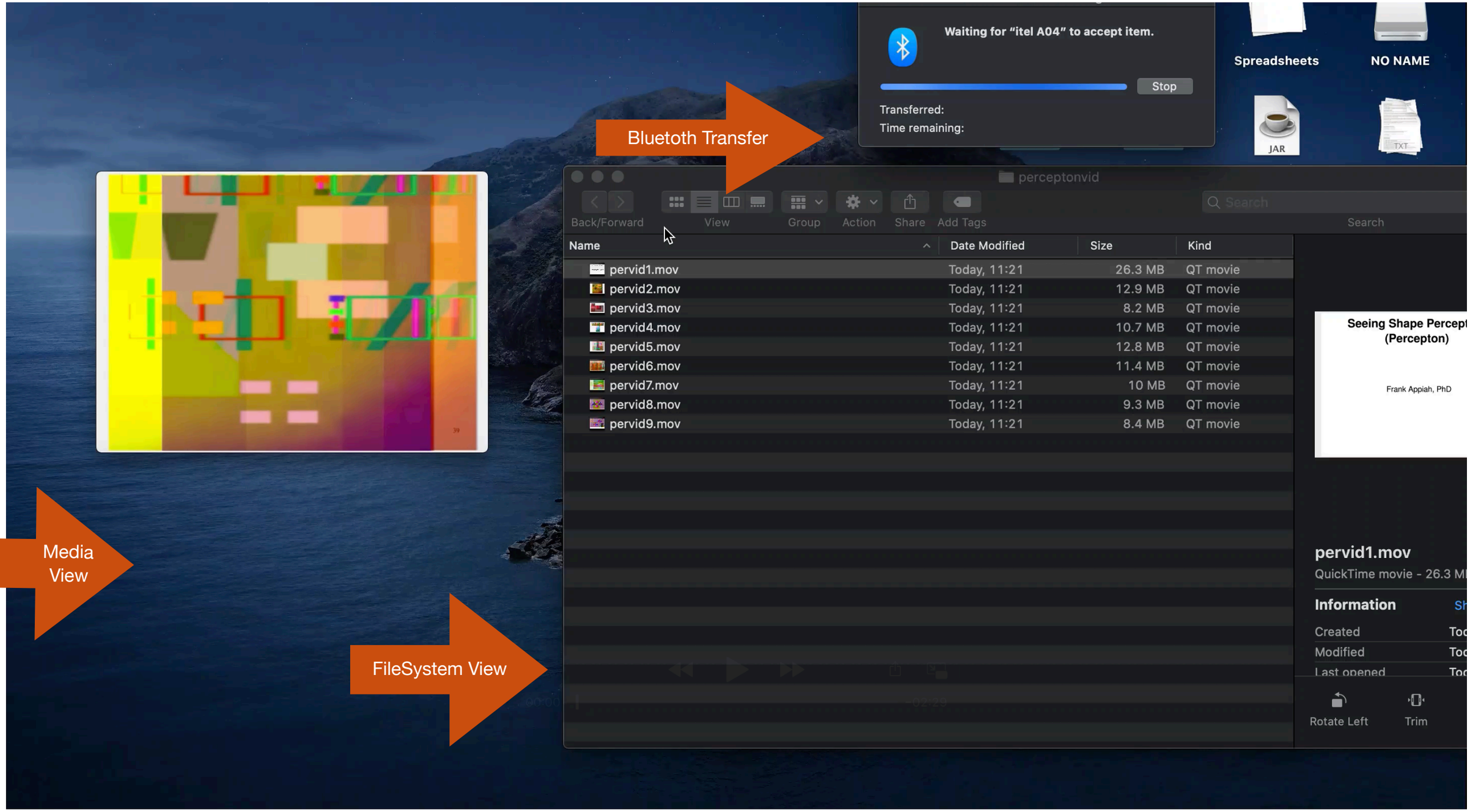

Media File Exchange

Dr Frank Appiah

# Introduction to Media Information

# Media Exchange.

**MIT Media Laboratory, IT Consortium**




Media File Exchange

# What is Media Information?

Media Information is about the creation, acquisition and exchange of media like images, video, data and text with metadata object details.

# What to look at for?

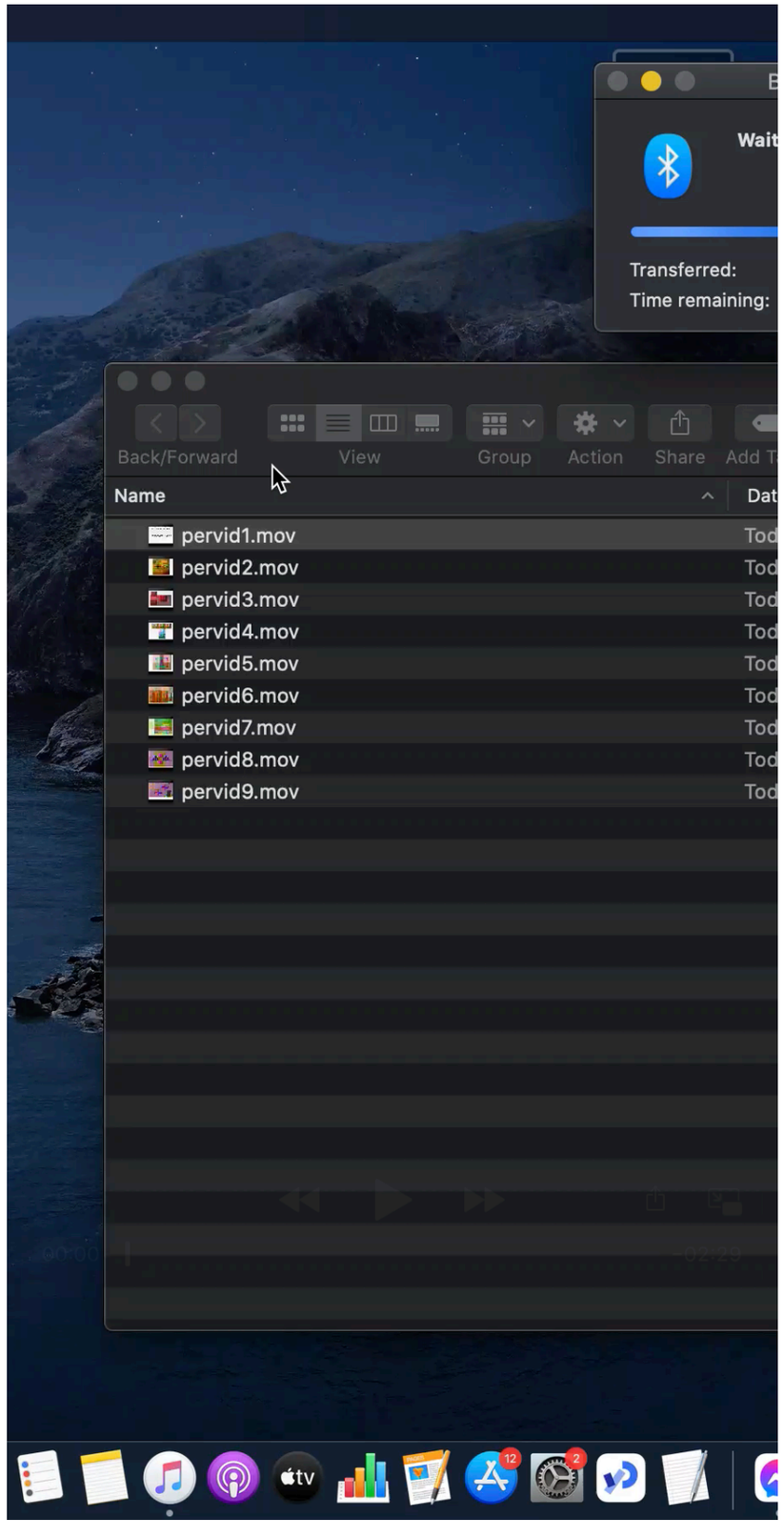
## Contents


1. Introduction to File System View

2. Media Content View

3. Media Exchange View

4. Conclusion

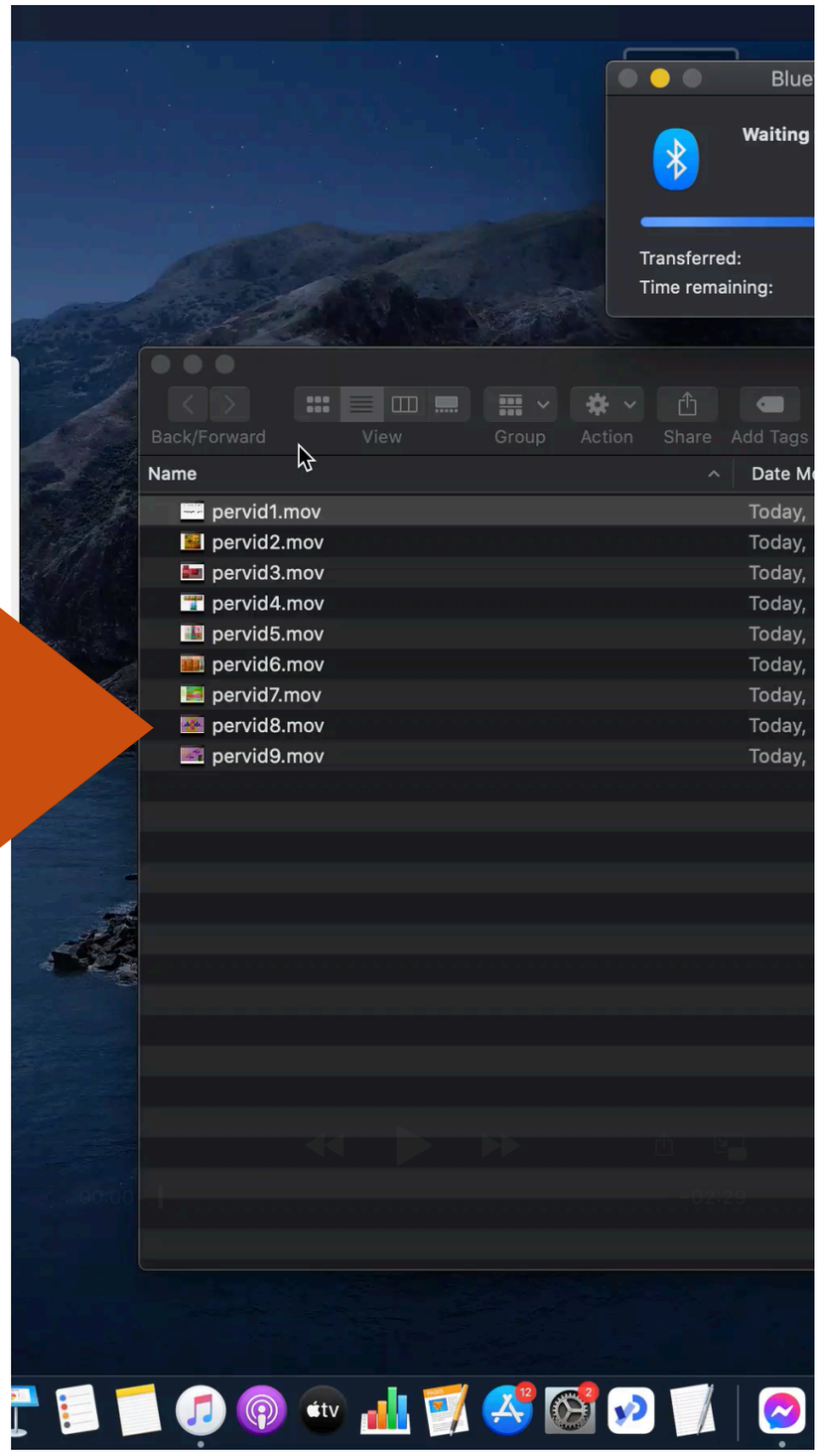




Bluetooth File Exchange

# 1. File System View

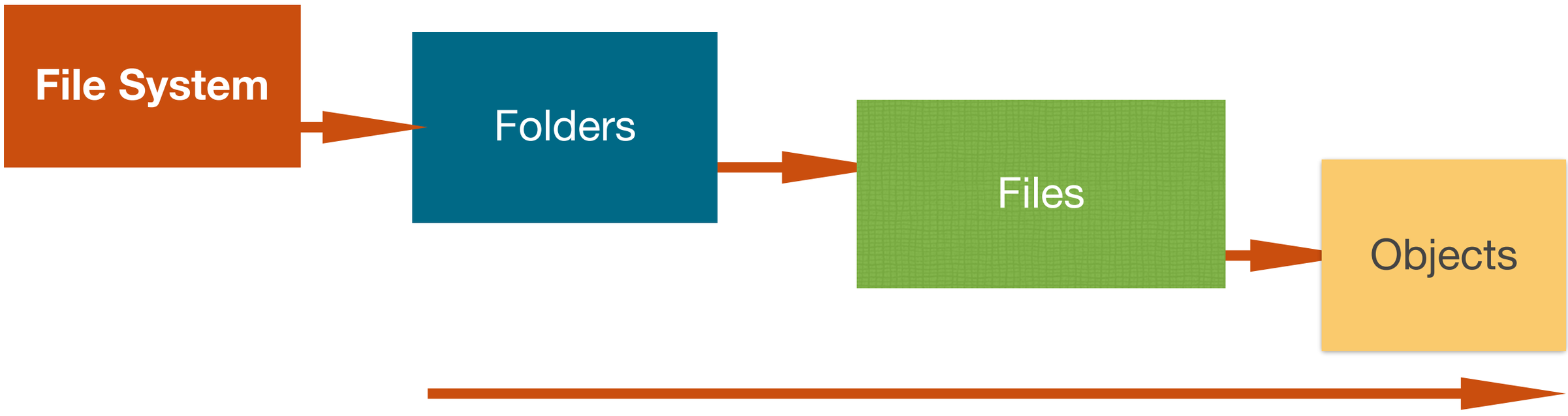
The pictorial view of the Mac machine is shown on the right side. In there are 9 movie files that are being prepared to be sent to a mobile device with an Internet support to publish the videos to Youtube.

There are 9 file names with each having pervid# where # is 1 to 9.

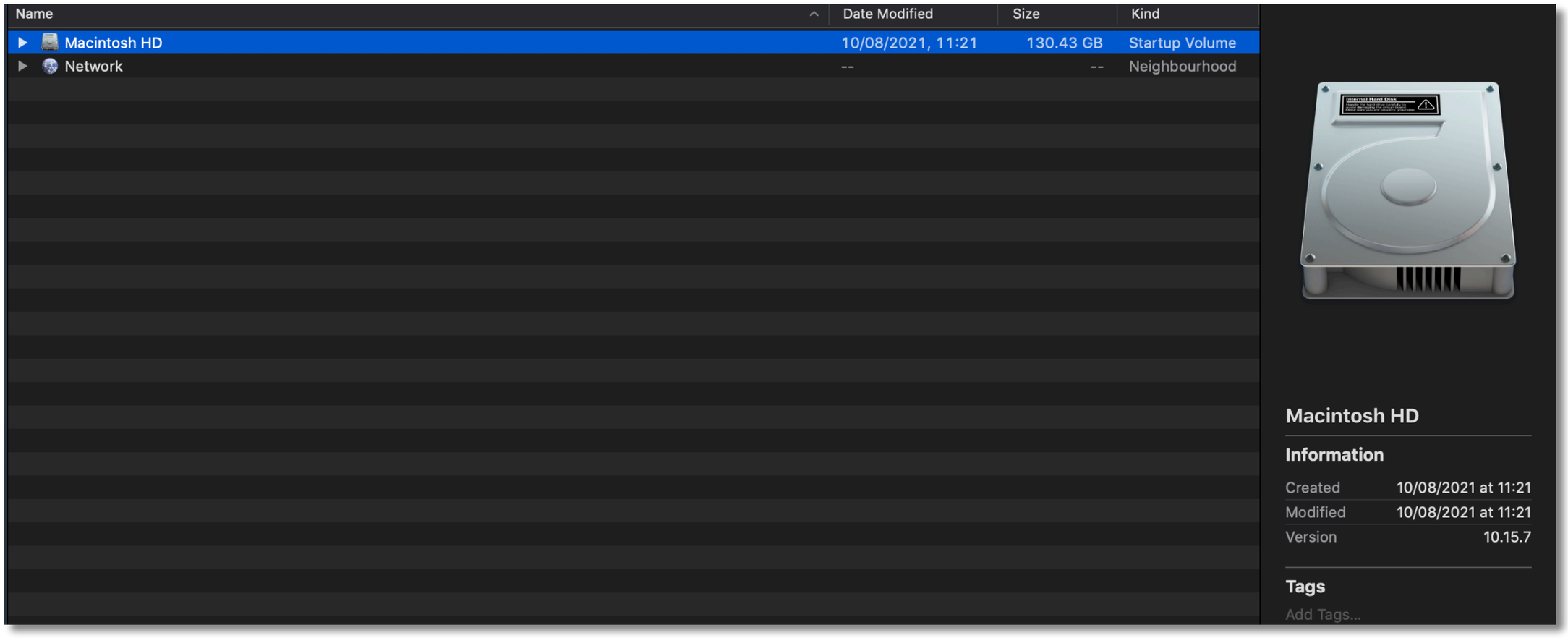



Computer - File System View

File system consist of folders that are made up of files that are made up of text objects, image objects, video objects, data objects, custom objects and more others.



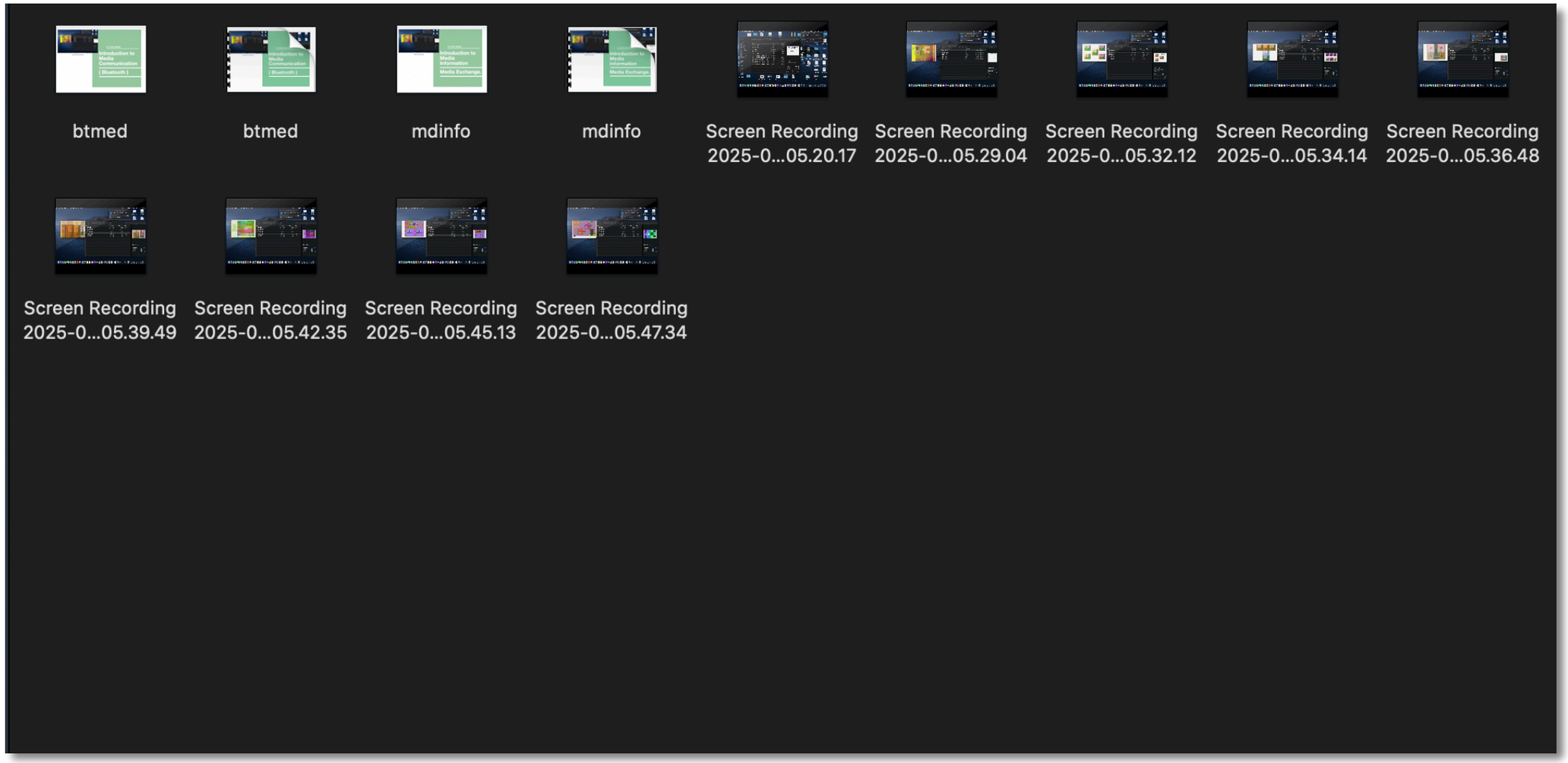
# File System


Name
Date Modified
Size
Kind
Macintosh HD
10/08/2021, 11:21
130.43 GB
Startup Volume
Network
--
--
Neighbourhood
Macintosh HD
Information
Created
10/08/2021 at 11:21
Modified
10/08/2021 at 11:21
Version
10.15.7
Tags
Add Tags...

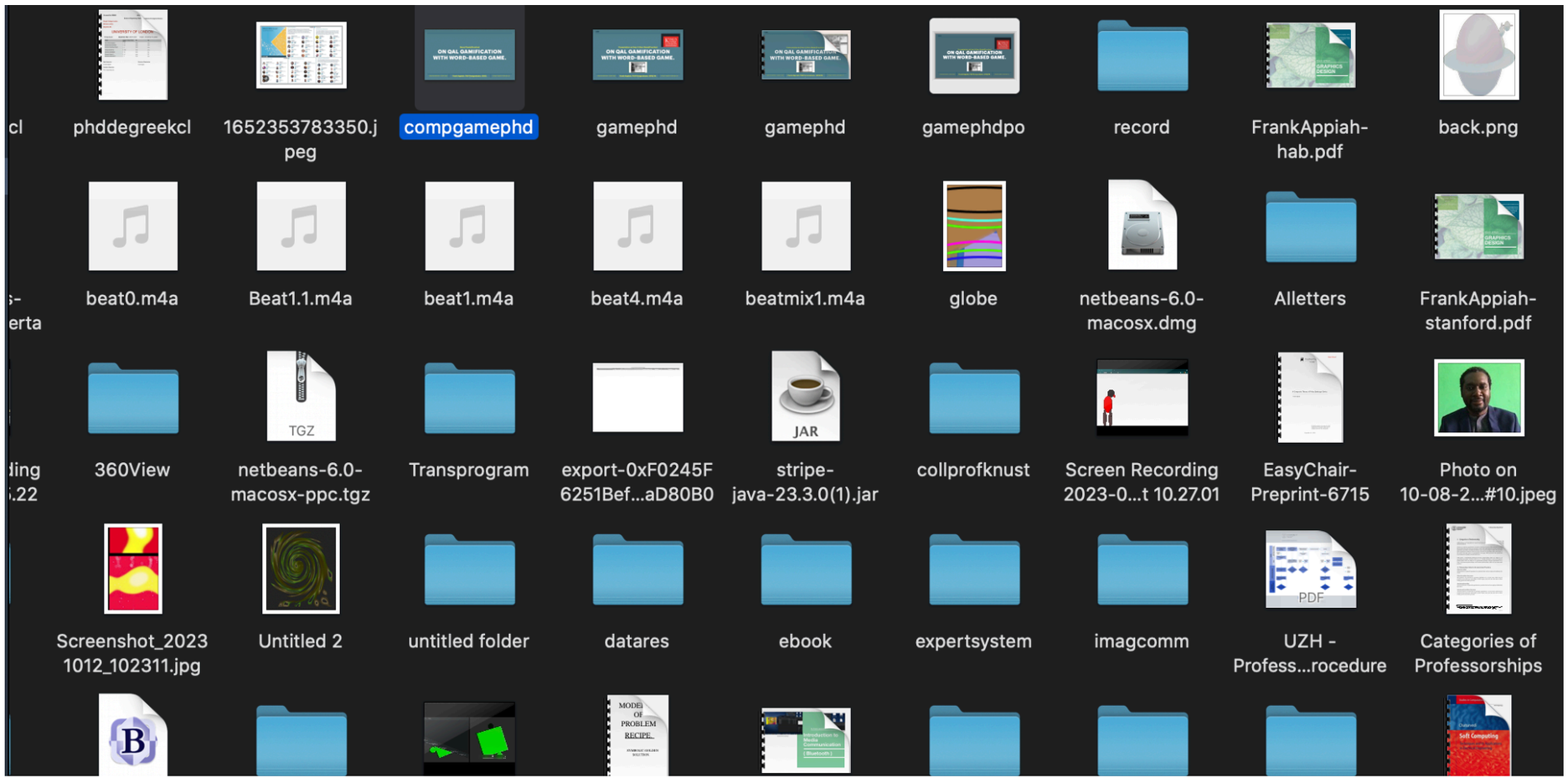
# Folders

Name
Date Modified
Size
Kind
Applications
10/08/2021, 11:21
--
Folder
Library
10/08/2021, 11:21
--
Folder
System
10/08/2021, 11:21
--
Folder
Users
10/08/2021, 11:21
--
Folder

# Files

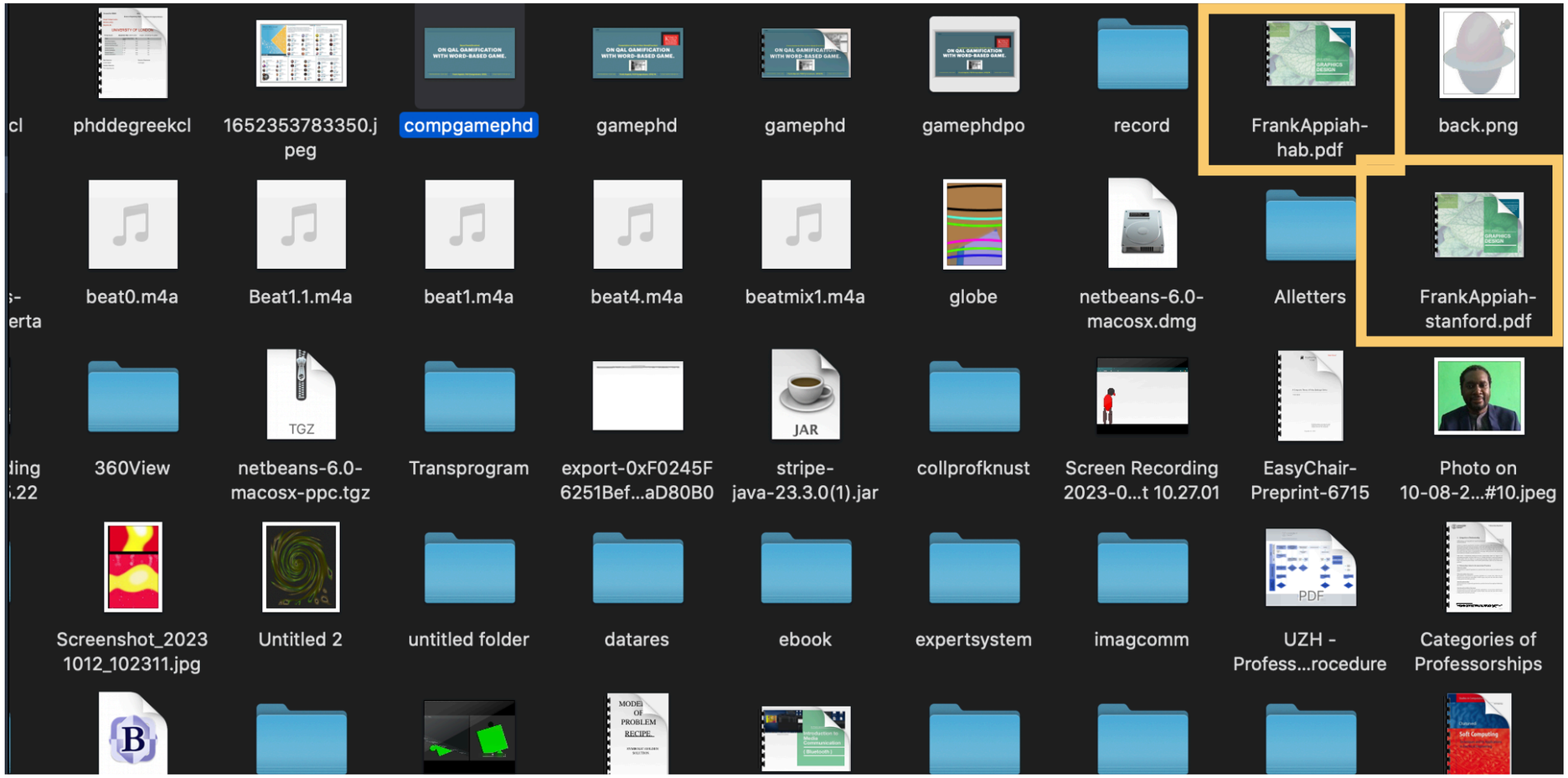

btmed
btmed
mdinfo
mdinfo
Screen Recording 2025-0...05.20.17
Screen Recording 2025-0...05.29.04
Screen Recording 2025-0...05.32.12
Screen Recording 2025-0...05.34.14
Screen Recording 2025-0...05.36.48
Screen Recording 2025-0...05.39.49
Screen Recording 2025-0...05.42.35
Screen Recording 2025-0...05.45.13
Screen Recording 2025-0...05.47.34

# Metadata Objects




We have metadata objects comprising of folders and files of several different objects or resources like pdfs, images(png, jpeg), audios(m4a), compressed data(tgz, zip, rar), installer(dmg), java application (jar), page document, etc.

# Metadata Types: Print Document Format (.PDF)




Print document format in its shorthand .pdf is a print media document that can contain information like image, text, video, audio and sound. Text information can be styled, coloured, resized, oriented, layout and arranged. Video, audio and sound can be linked as hyperlink web media on the internet for future reference. Layout information is fixed and can be edited later in pdf editors.

## Making PDF

(1) Pdf can be made from an office system like Microsoft Office for Windows OS.

(2) For Linux like Fedora, Ubuntu, Kubuntu and more, OpenOffice is used mostly.

(3) For Mac OS, Pages Software is mostly used to create one.

(4) Office extension files like .doc, .docx, .page and more can be exported into a pdf file on a PC.

(5) PDF is a document formed by structured code in placing a text, image, link and more.

(6) The size of pdf depends on the content of the imported document yet to export.

(7) PDF can be programmed or coded with Processing IDE to create one. It is based on rendering a text content, image content, etc with graphics drawing method.

(8) Other is itext, Java library used in programming in much detail at the source file level.

# Image Types: JPEG, PNG, GIF

Graphics Interchange Format (GIF), Portable Network Graphics (PNG) and Joint Photographic Experts Group (JPEG)

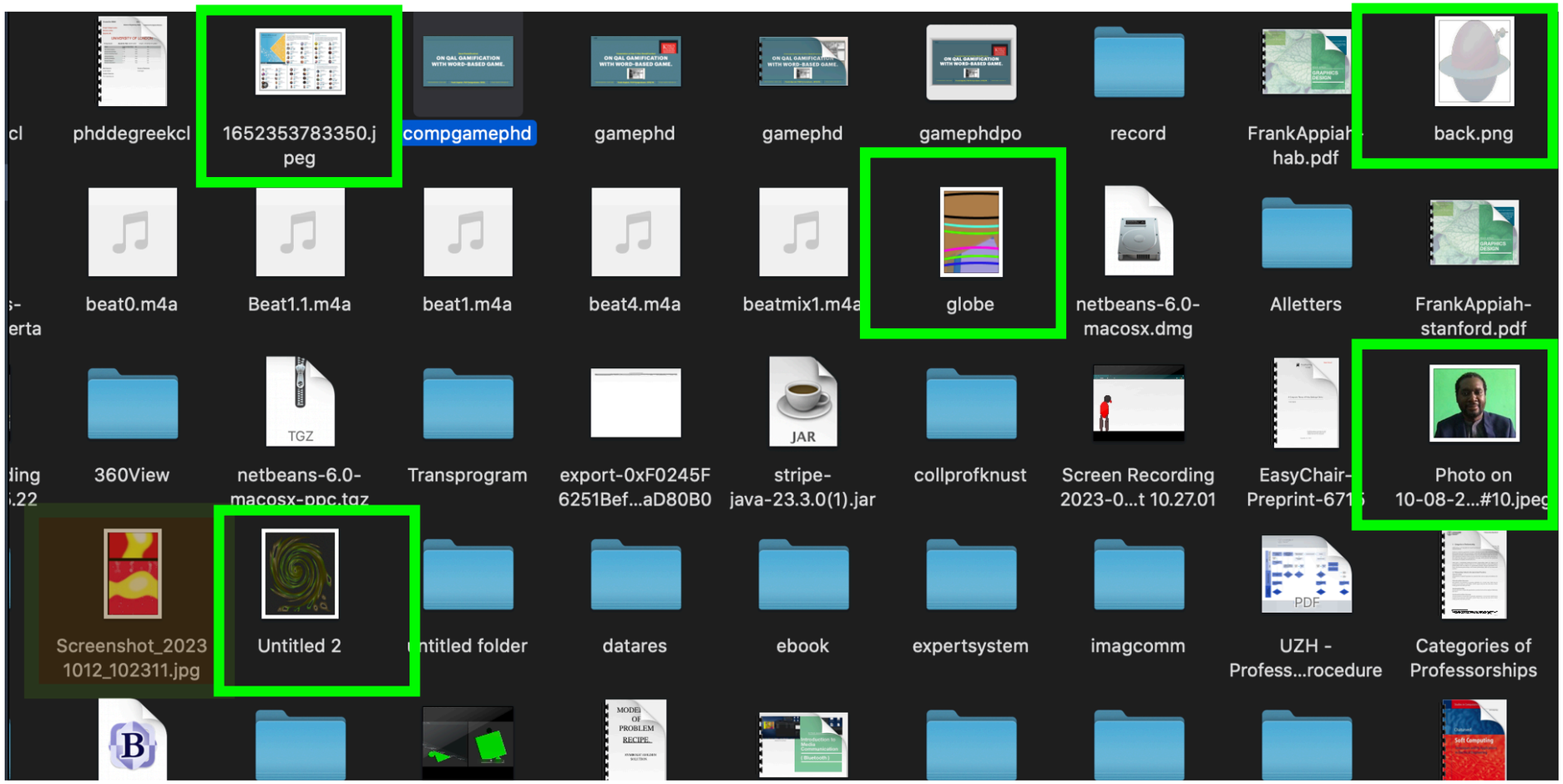



Image can be captured, created and exchanged. Image capturing can be done with a camera or mobile builtin camera. Image can be created as made by drawing with drawing tools like Gimp, Preview, Inkscape and more.

Image as file in a folder of a file system can be exchanged to other formats: (1) png -> jpeg (2) jpeg -> png (3) gif -> png (4) gif -> jpeg (5) png -> gif (6) jpeg -> gif. The data in these images are normally compressed-decompressed data formats. Data format is in hexadecimal.

# Image
# Types: PNG.

Portable Network Graphics is a raster-graphics file format that supports lossless compressed data. PNG was developed to improve GIF.

**File Extension**: .png

**Type Code**: PNGf

**Internet media type**: image/png

**UTI Conformation**: public.image

**Uniform Type Identifier**: public.png

Magic Number: **89 50 4e 47 0d 0a 1a 0a** (8 bytes Hexadecimal).

**Type of format**: Lossless bitmap image format

**Extended to**: APNG, JNG, MNG

**Standard**: ISO/IEC 15948 IETF

**Open Format**: Zlib/libpng License

**Website**: www.w3.org/TR/png

**Initial Release**: 1 October, 1996, 28 years ago.

Image
Color Format: PNG.

1. It supports palette-based image (with palette of 24-bit RGB, Red-Green-Blue or 32-bit RGBA, Red-Green-Blue-Alpha colours.

2. It supports grayscale with or without alpha channel for transparency.

3. It supports full colour non-palette based RGB or RGBA images.

4. CMYK is not supported.

# Image
# Design Purpose: PNG.

1. It was designed for transferring images on the Internet.
2. It is designed to contain a single-image format in extensible structure of chunks.
3. It encodes its basic pixels and other text comments, and integrity checks.
4. Hex Editor can be used to view the file format contents in hexadecimal.

**Making An Image Format from Other.**

(1) For example to convert a .png image to .gif image. What will you use in the process?

(2) A Preview tool can be useful on Mac. It exports the original format to the new format.

(3) On Windows, Gimp (Graphics Image Manipulation Tool) can be used in exporting or exchanging formats.

(4) On Linux, Gimp can be use here.

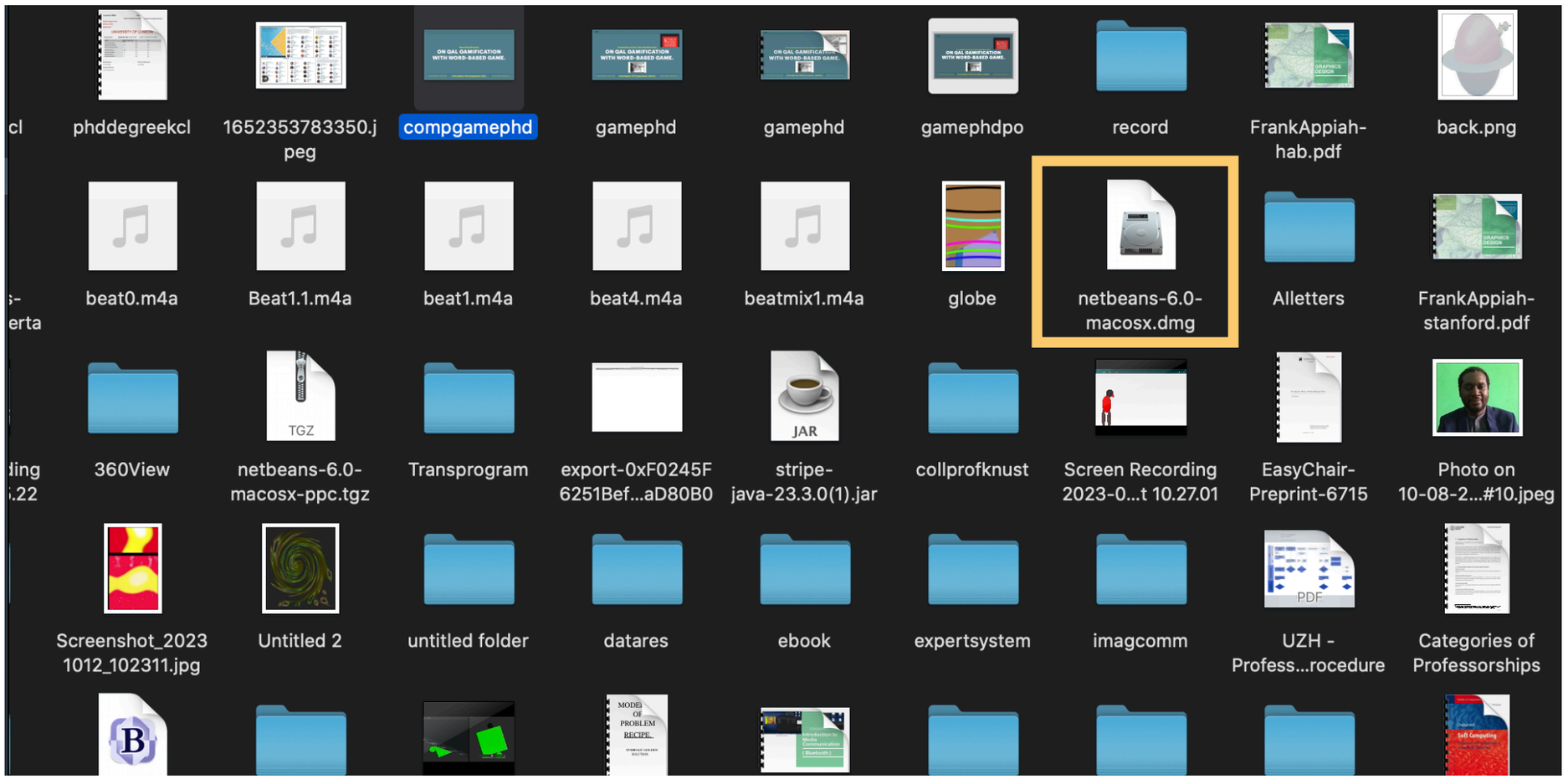
(5) Programming .png to .gif, one can use ImageIO utility package or library on Java Platform to do the conversion.

# Image Advantages: PNG.

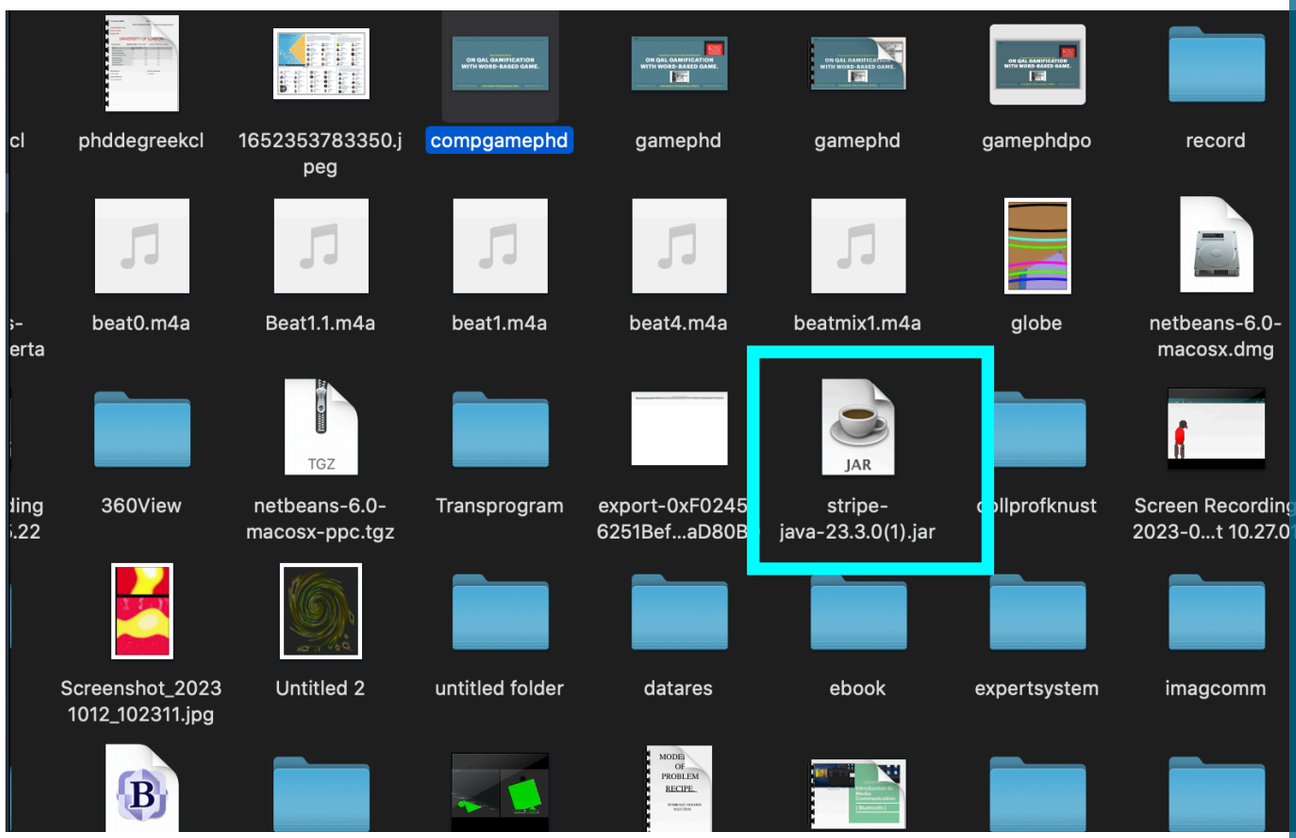
1. It is designed to contain a single-image format in extensible structure of chunks.
2. It encodes its basic pixels and other text comments, and integrity checks.

# Metadata Types: INSTALLER (.DMG)

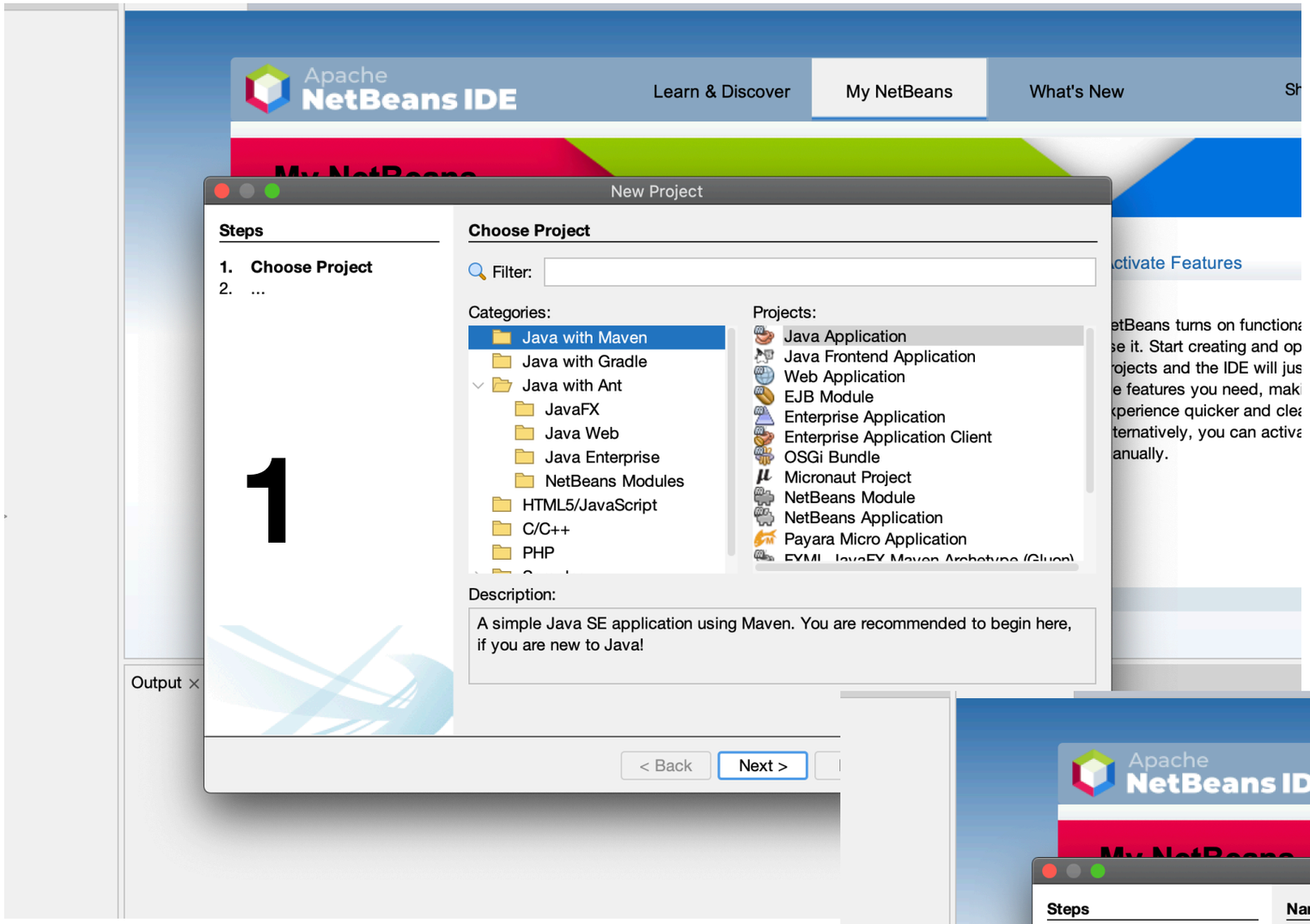
This example is a MAC PC installer for Netbeans version 6.0. The file extension is .dmg meaning disk image. DiskImageMounter mounts a dmg file into the computer disk space for end usage. The single file is kind of unwrapped into a folder system. The contents can be accessed from the unwrapped and damp into folder structure. It requires a read and write permission in order to install its content.

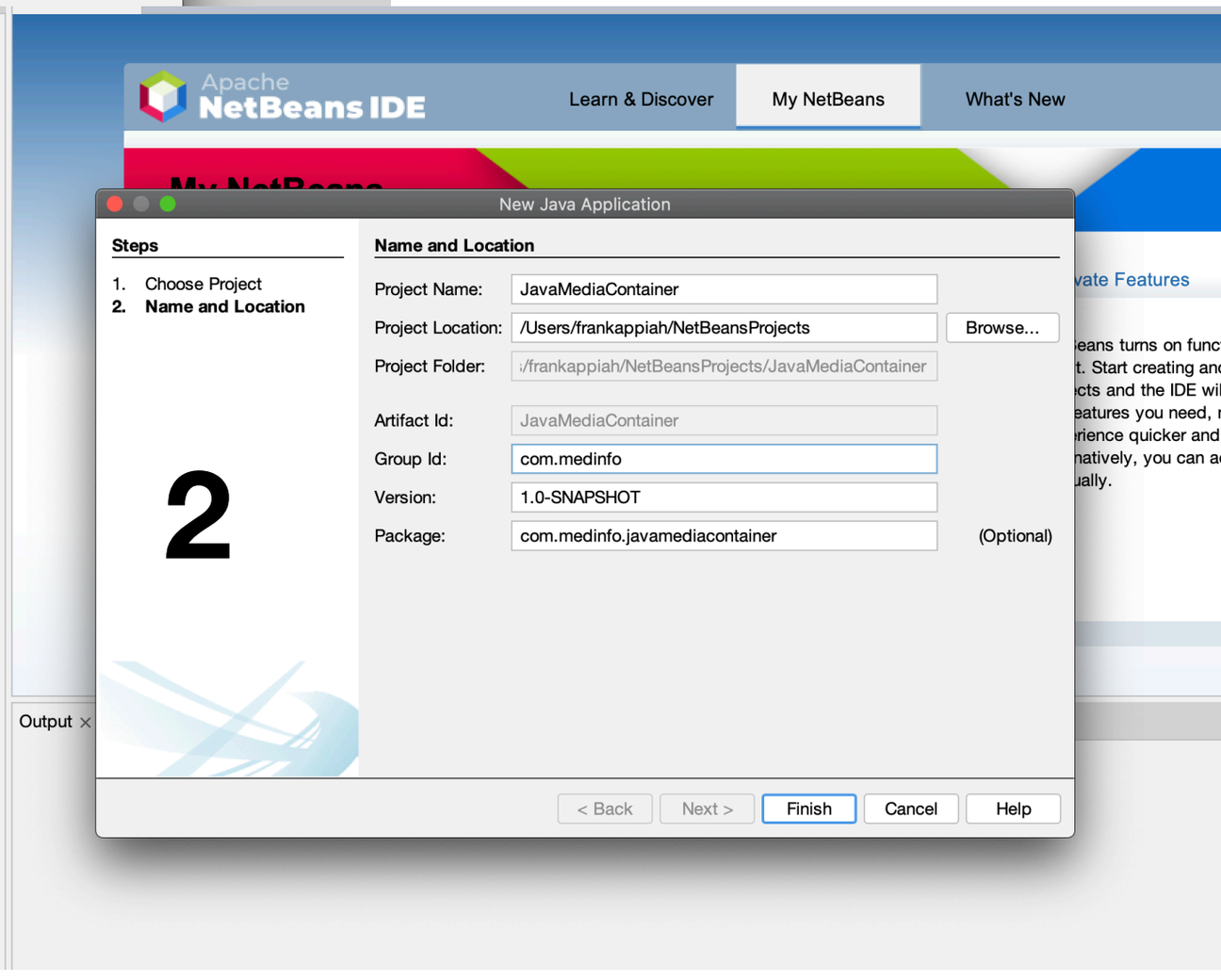


# Metadata Types: INSTALLER (.JAR)




JAR is shorthand for Java Archive Resource. It is built by java compiled classes as also a container of .java source files runtime library. This outputs can be made from Integrated Development Environment like Netbeans, Eclipse and mainly java compiler on System Terminal Command Line. It can be used also a media container for images, video, pdf, audio and more. This especially includes application icon, startup screen images, background image for Graphical User Interface (GUI), etc. Jar Launcher is the opening application for such .jar file extensions.




# Java Media Container

Jar is an executable file for aftermath of java source file compilation. This makes it a good candidate to create executable images, videos, text, pdf, etc.

We will look at just compiling a media container for future use in making a java media library. I will start Netbeans in doing just that moment.

Projects Files Services Favorites

JavaMediaContainer

src

pom.xml

3

JavaMediaContainer.java - Navigator

Members <empty>

JavaMediaContainer

JavaMediaContainer()

main(String[] args)

Projects Files Services Favorites

JavaMediaContainer

src

main

java

com

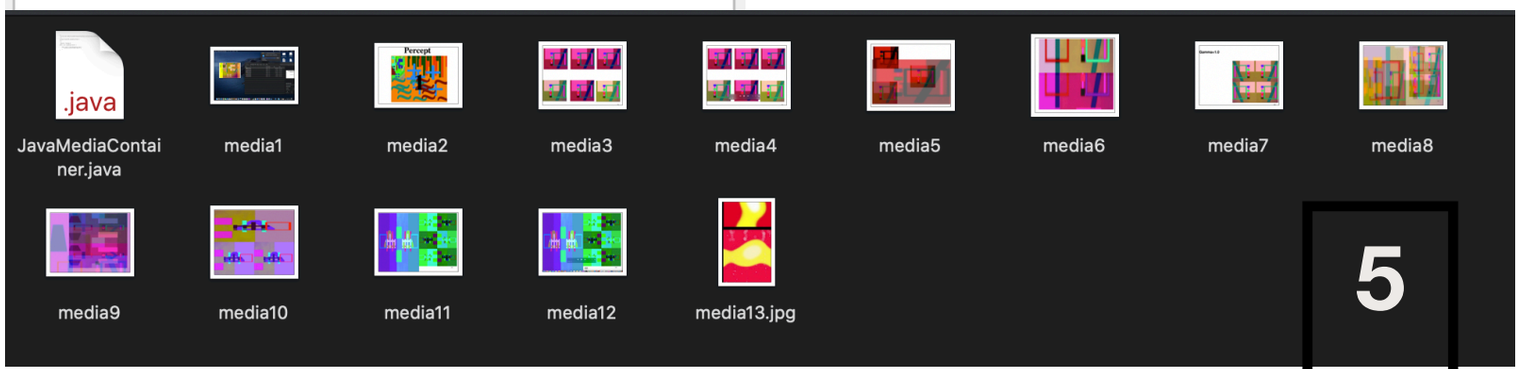
medinfo

javamediacontainer

JavaMediaContaine

pom.xml

4




Proj... Files Services Favorites

JavaMediaContainer

Source Packages

com.medinfo.javamediacontainer

JavaMediaContainer.java

media1.png

media10.png

media11.png

media12.png

media13.jpg

media2.png

media3.png

media4.png

media5.png

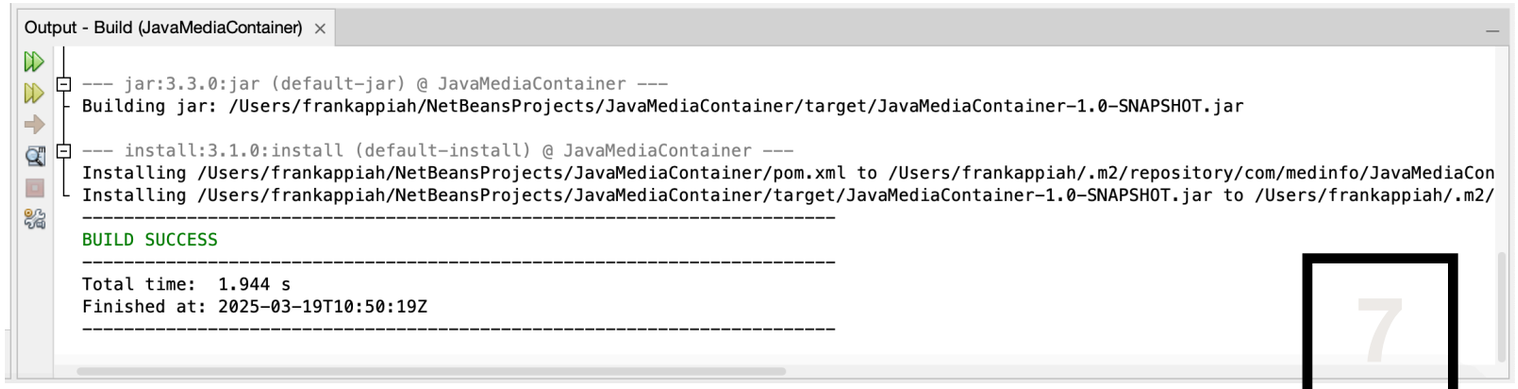
media6.png

media7.png

media8.png

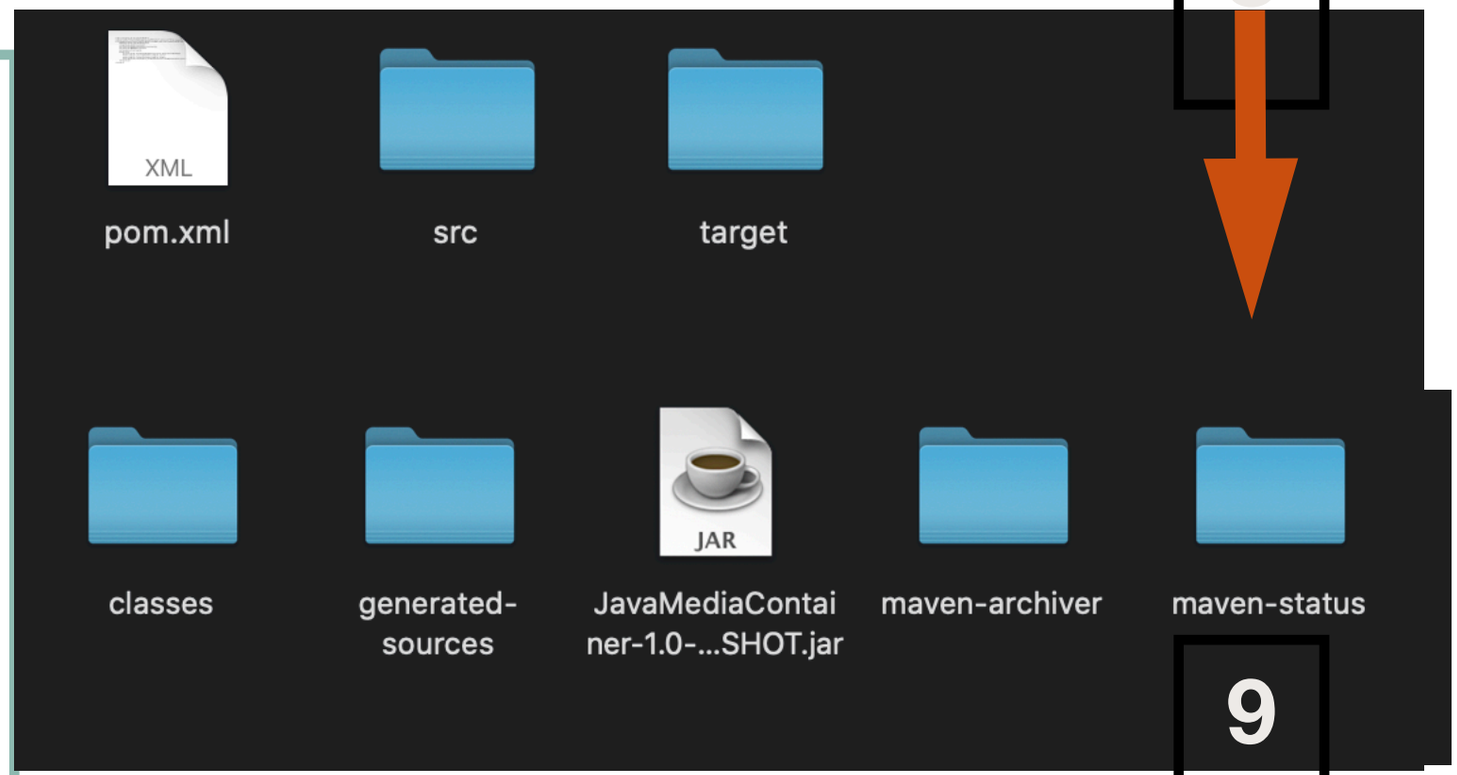
media9.png

6


Output - Build (JavaMediaContainer)
--- jar:3.3.0:jar (default-jar) @ JavaMediaContainer ---
Building jar: /Users/frankappiah/NetBeansProjects/JavaMediaContainer/target/JavaMediaContainer-1.0-SNAPSHOT.jar
--- install:3.1.0:install (default-install) @ JavaMediaContainer ---
Installing /Users/frankappiah/NetBeansProjects/JavaMediaContainer/pom.xml to /Users/frankappiah/.m2/repository/com/medinfo/JavaMediaCon
Installing /Users/frankappiah/NetBeansProjects/JavaMediaContainer/target/JavaMediaContainer-1.0-SNAPSHOT.jar to /Users/frankappiah/.m2/
BUILD SUCCESS
Total time: 1.944 s
Finished at: 2025-03-19T10:50:19Z

# COMPILE TARGET

1. A new project is created with JavaMediaContainer with package name com.medinfo
2. The new project is finished.
3. We look at the project file in Project View
4. The src is expanded to the last folder.
5. The 12 images are copied to the last folder which is javamediacontainer in Folder System View in Home folders.
6. After return to see the images appear to the side of source file, JavaMediaContainer.
7. Set as main project and then clean&build.
8. Get back to NetbeansProject folder, locate the Javamediacontainer project.
9. Open to (8) then open target to (9).



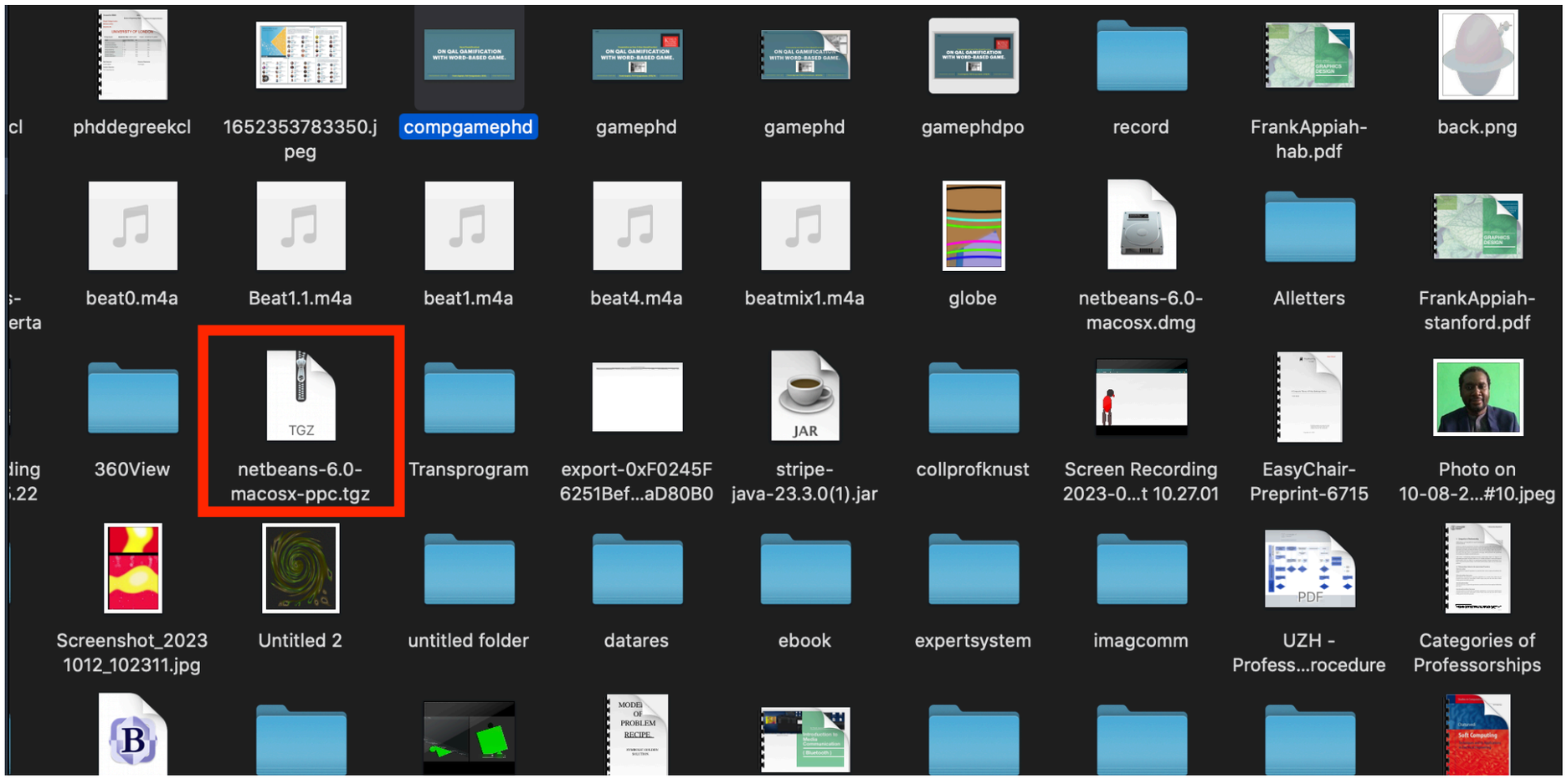

7

8

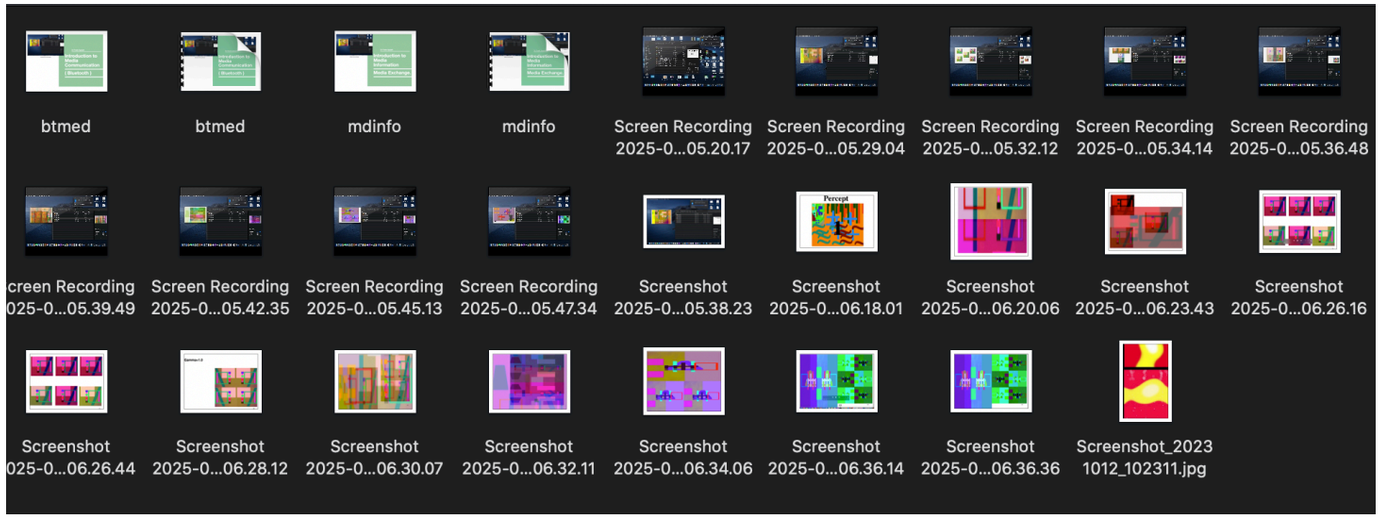
9

Not only images can be compiled this way but videos, pdfs, text files and other media resources can be jarred together in a single jar file.

# Metadata Types: COMPRESSED DATA (.TGZ, .ZIP)

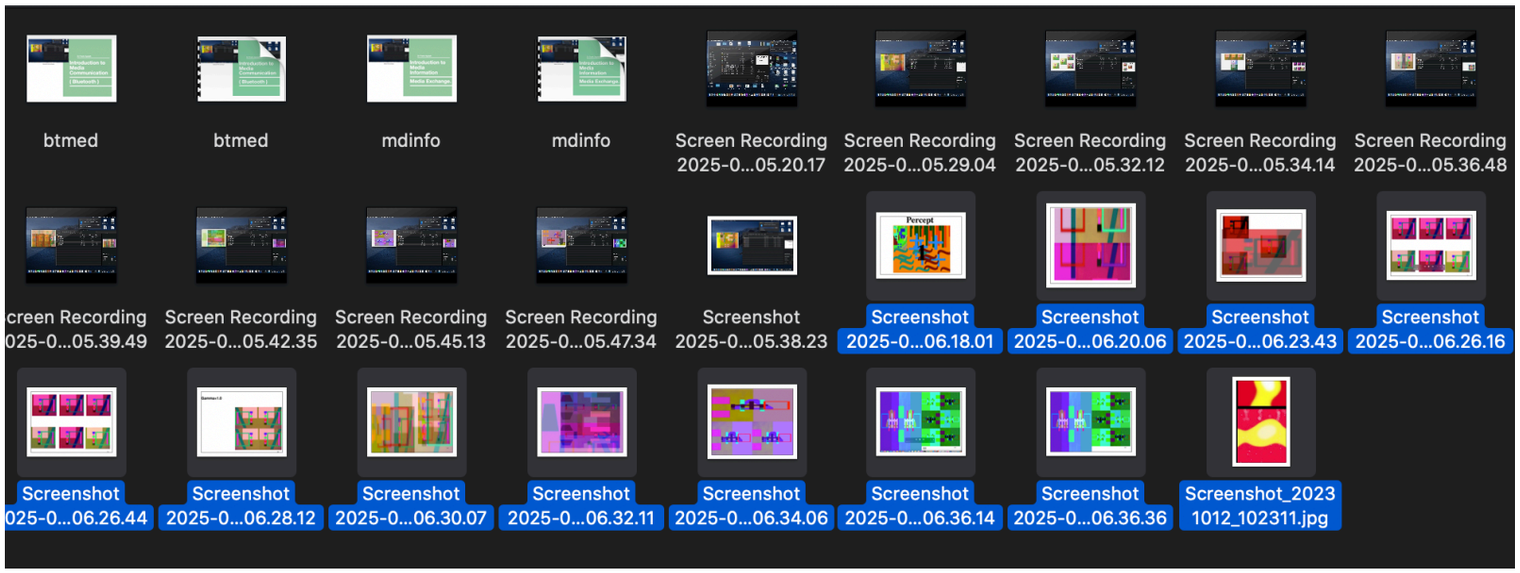



.TGZ is a compressed data that will reveal its content when unzipped by a decompressed utility tool. The tools normally uses the file extension to name its product. There are other compressed data formats like zip (most popular), rar, etc. Rar is used by Rar Utility Program to decompress the file into a folder structure. It can reveal a folder into another folder and into more folder. It is a kind folder layout into the computer file system. It preserves the name of the folder just as in the zip form.




1. Unselected Images in folder view.

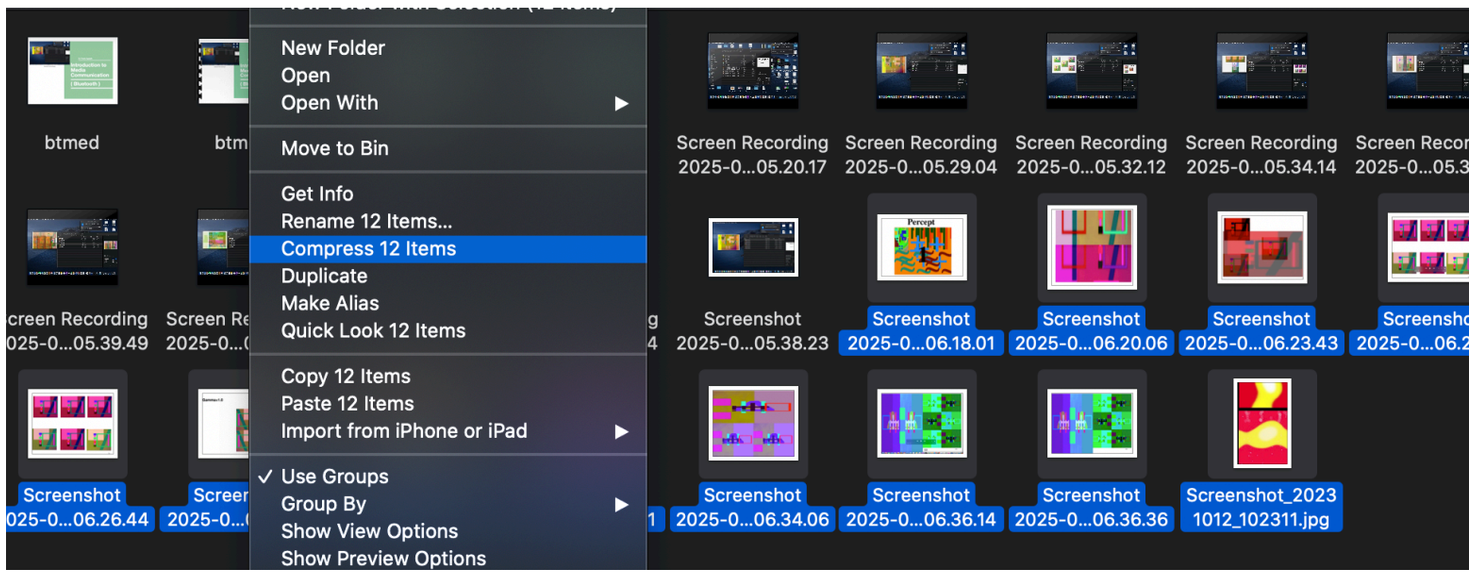
2. Selected Images in folder view to be compress.

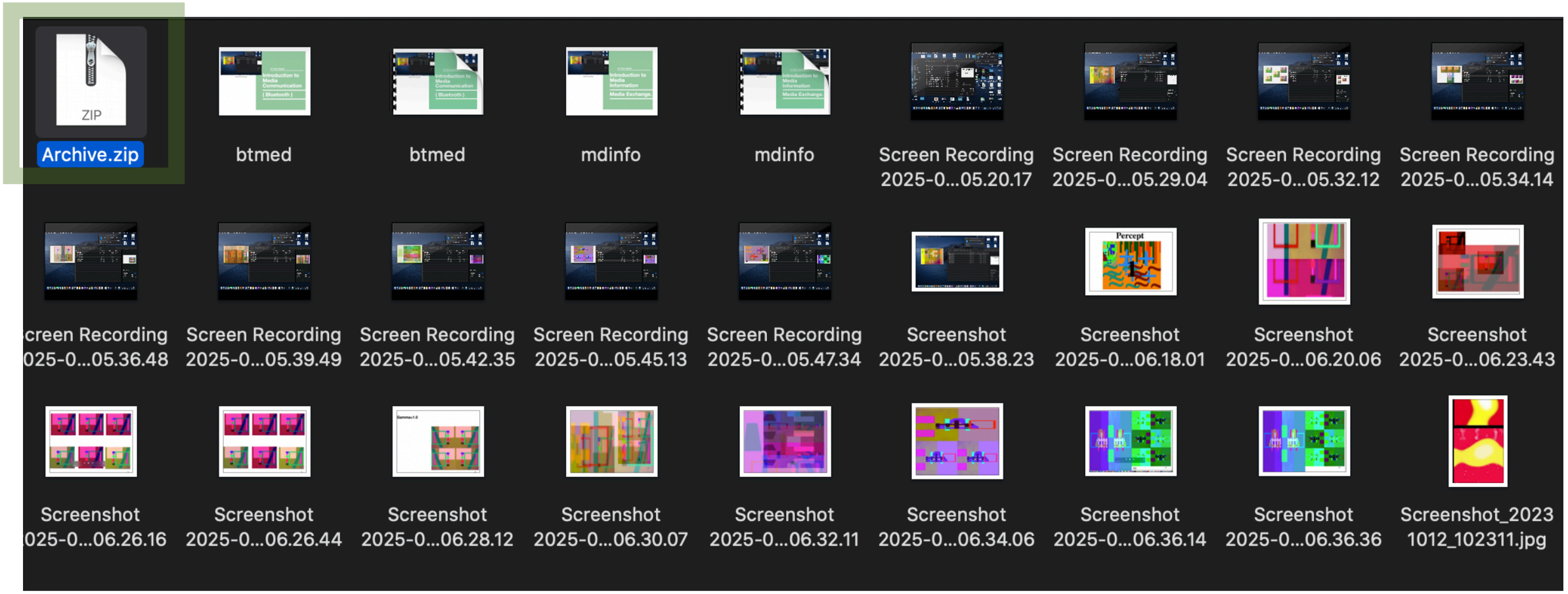



# Making Zip File

Zip compression and decompression is a two-way reverse process in making a zip in compression data format and unzip in decompression data format. .zip is the file extension name.

3. Compressing 12 items into zip format.

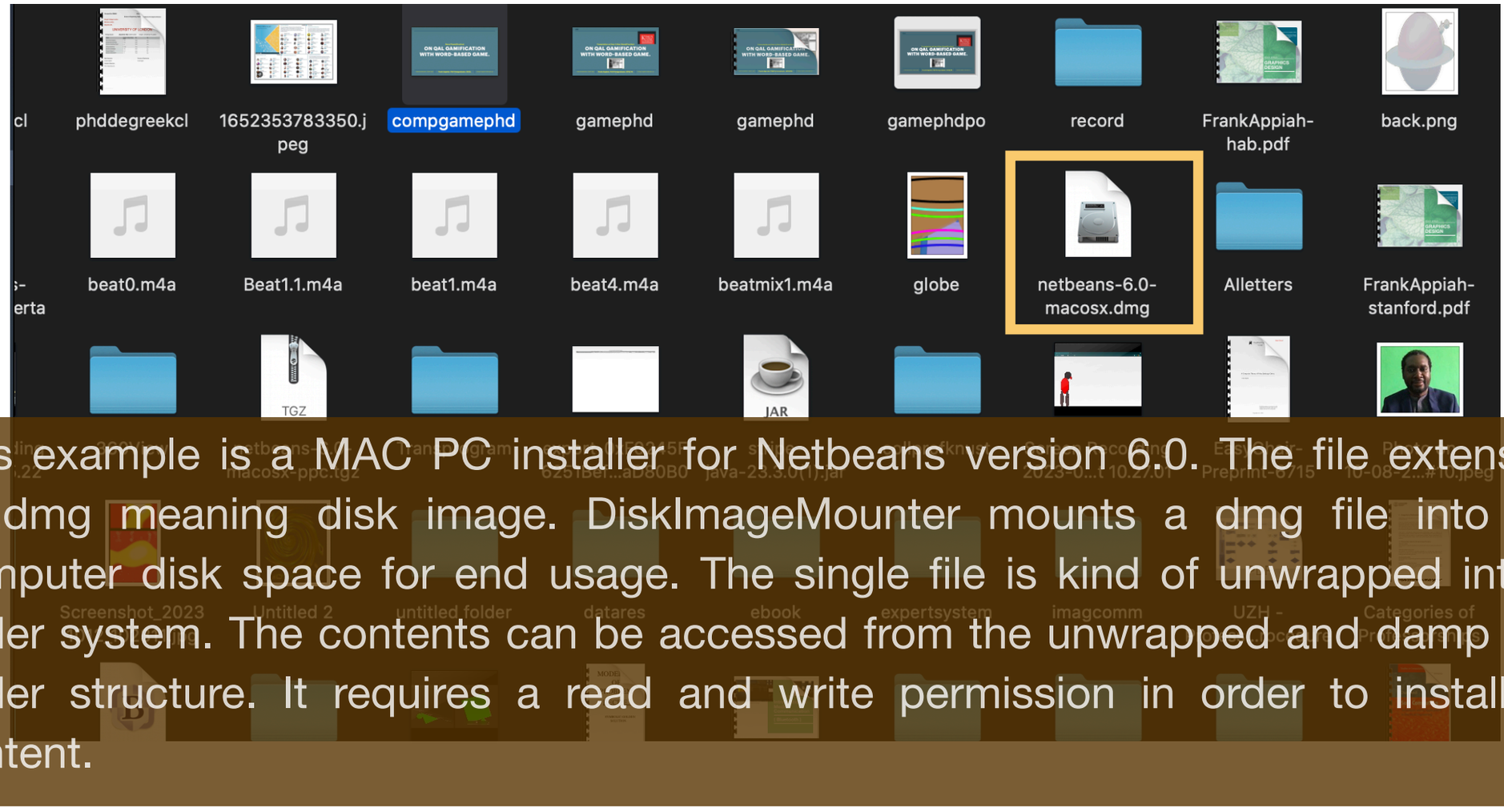





# Archive.zip

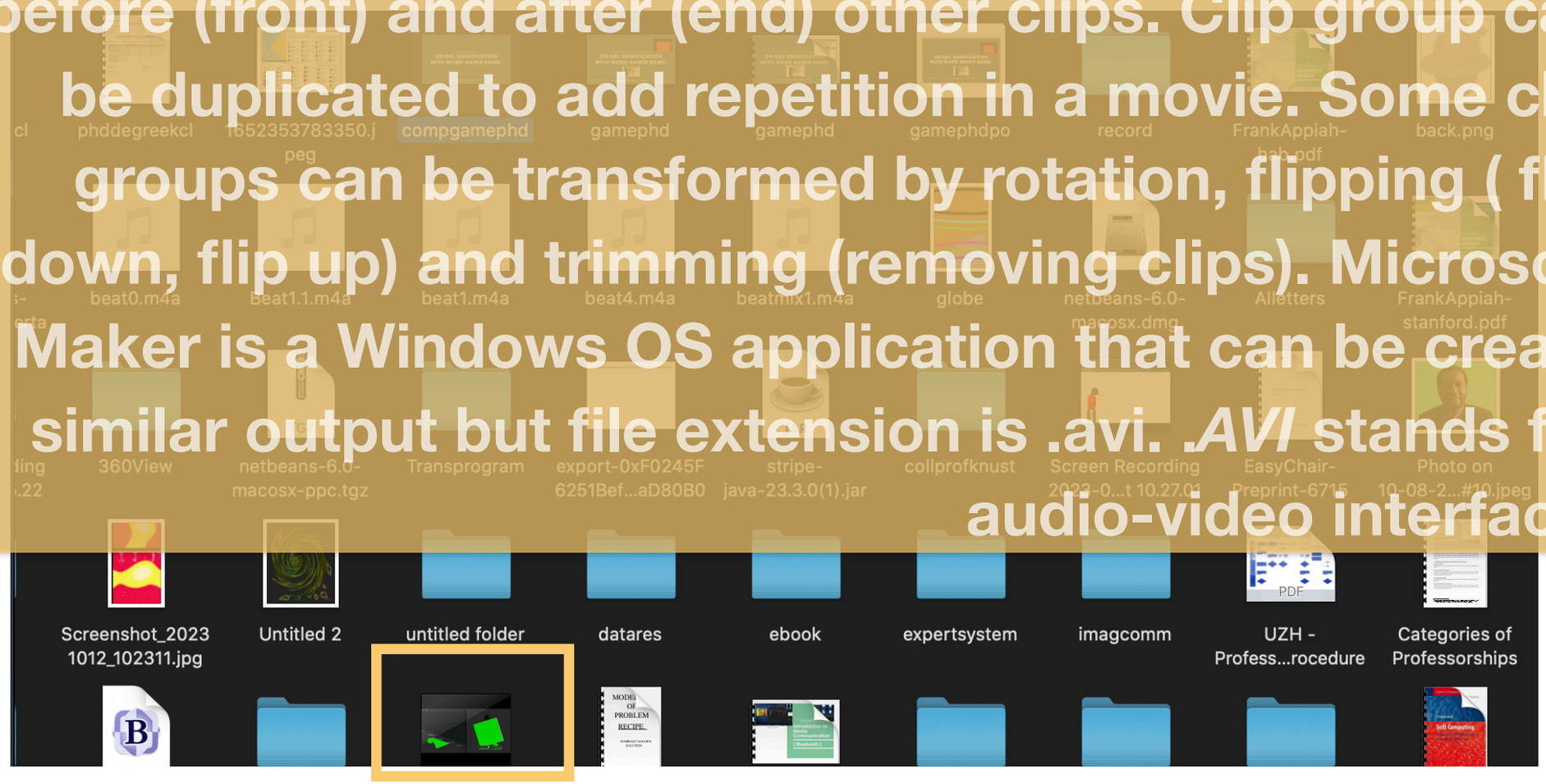
The compressed file format after the 12 items are packed into one zip file format. Illustration is placed in a green box border. This is done to have a single go on media exchange situation.

# Metadata Types: INSTALLER (.DMG)

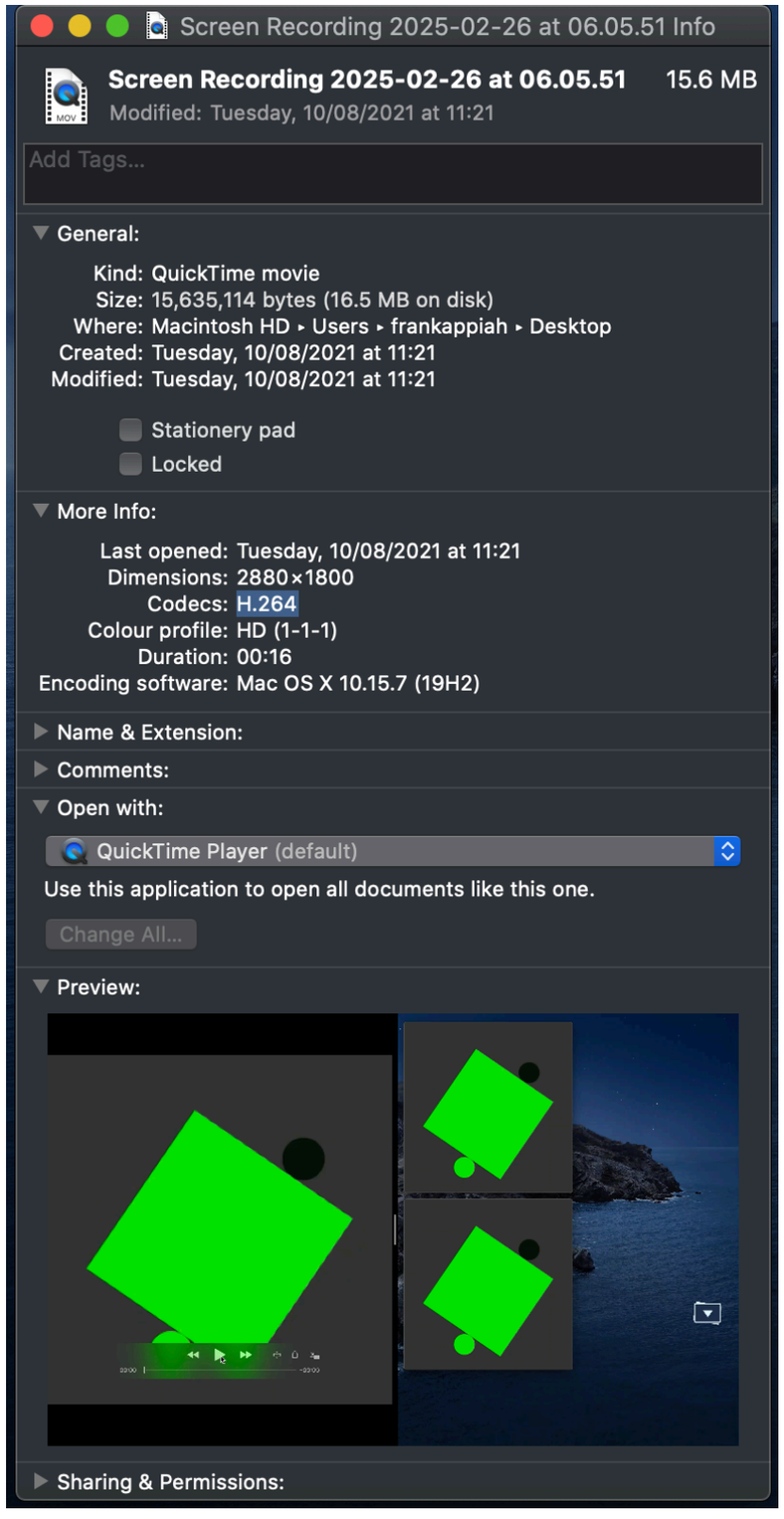



This example is a MAC PC installer for Netbeans version 6.0. The file extension is .dmg meaning disk image. DiskImageMounter mounts a dmg file into the computer disk space for end usage. The single file is kind of unwrapped into a folder system. The contents can be accessed from the unwrapped and damp into folder structure. It requires a read and write permission in order to install its content.

***.MOV*** **is a movie file extension. This is made by QuickTime Player on Mac machine. This clip editing feature that allows placement of clip (a single image) before (front) and after (end) other clips. Clip group can be duplicated to add repetition in a movie. Some clip groups can be transformed by rotation, flipping ( flip down, flip up) and trimming (removing clips). Microsoft Maker is a Windows OS application that can be create similar output but file extension is .avi. *.AVI* stands for audio-video interface.**



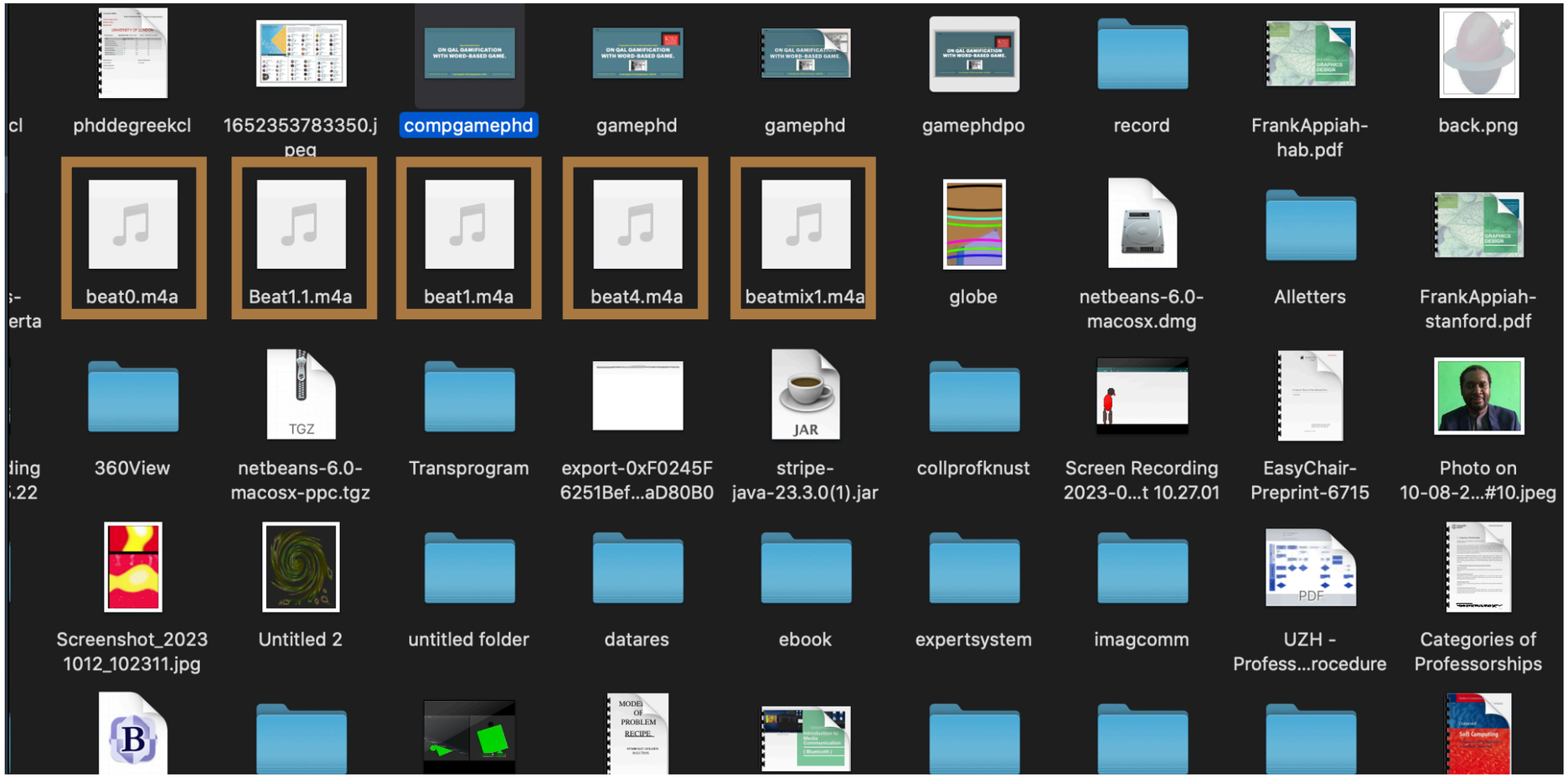

Metadata
Types: MOVIE (.MOV)



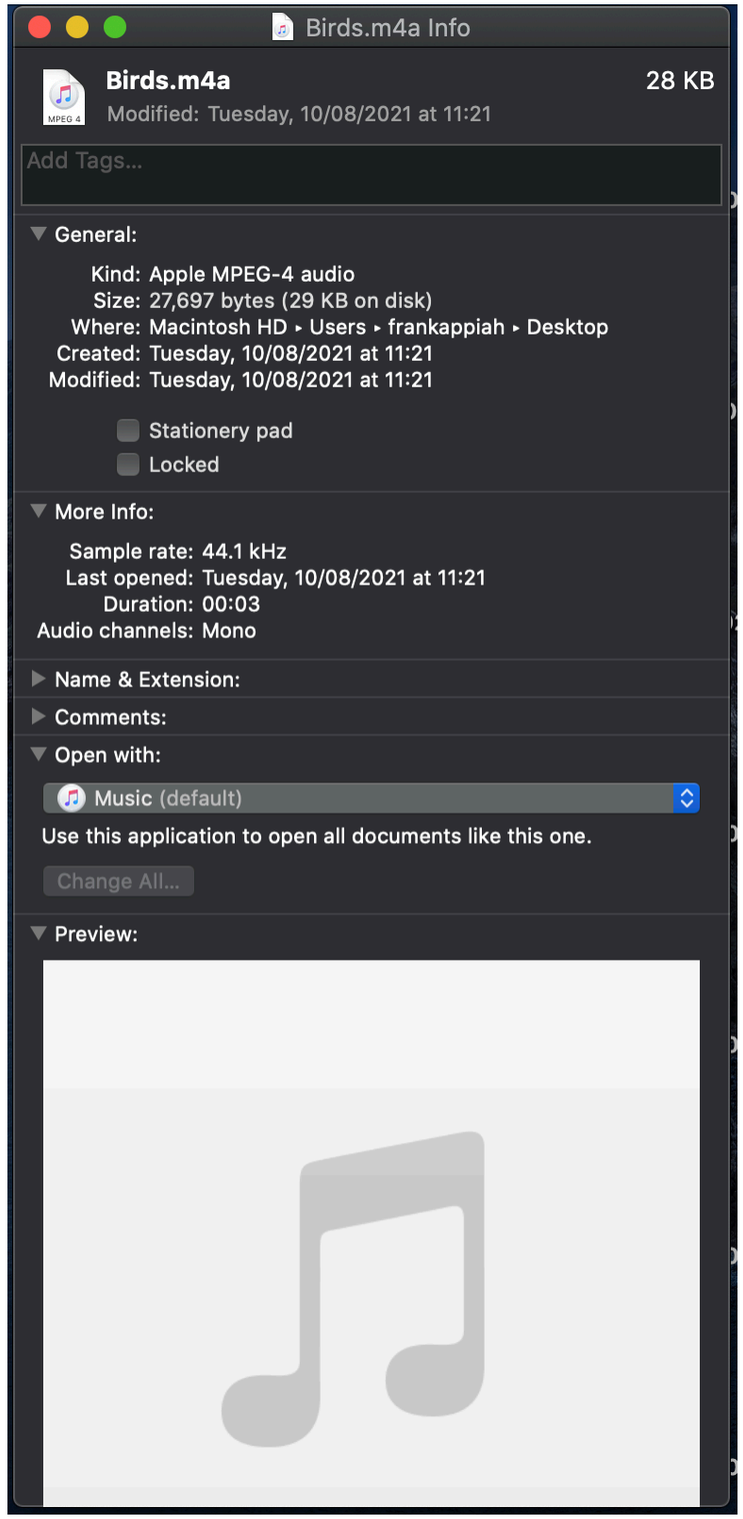

1. A look at dimensions of width and height. 2880 x 1800.
2. A look at codecs. H.264 for this QuickTime Player.
3. A look at colour profile. HD (1-1-1).
4. A look at duration. 00:16 seconds
5. A look at encoding software. Mac OS X 10.15.7
6. A look at preview window.
7. Other areas to look at comment, open with details, sharing & permissions.

*The .mov was made from screen recording on a MacOS.*

# Metadata
# Types: AUDIO (.M4A)



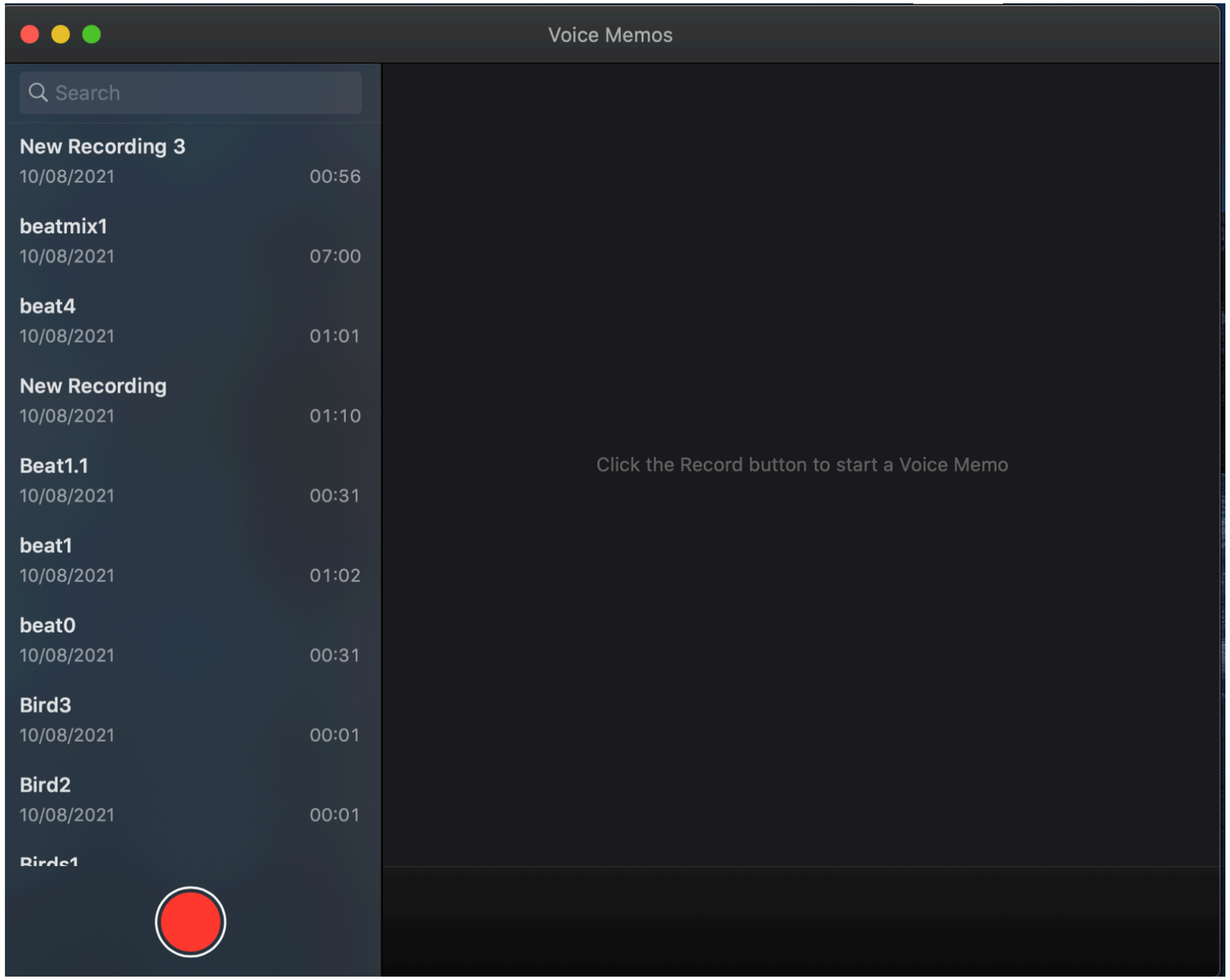

.M4A is Apple MPEG-4 audio version 4. It is an output from microphone recording on a Mac OS. It was created with Voice Memos software. It is made for as a default recording tool mainly for audio purposes.




# What to look at in .m4a?

## A look at size of file. 27697 (29 KB on disk)

1. A look at sample rate. 44.1kHz
2. A look at duration. 00:03 seconds
3. A look at audio channels. Mono
4. Other areas to look at comment, open with details, sharing & permissions.



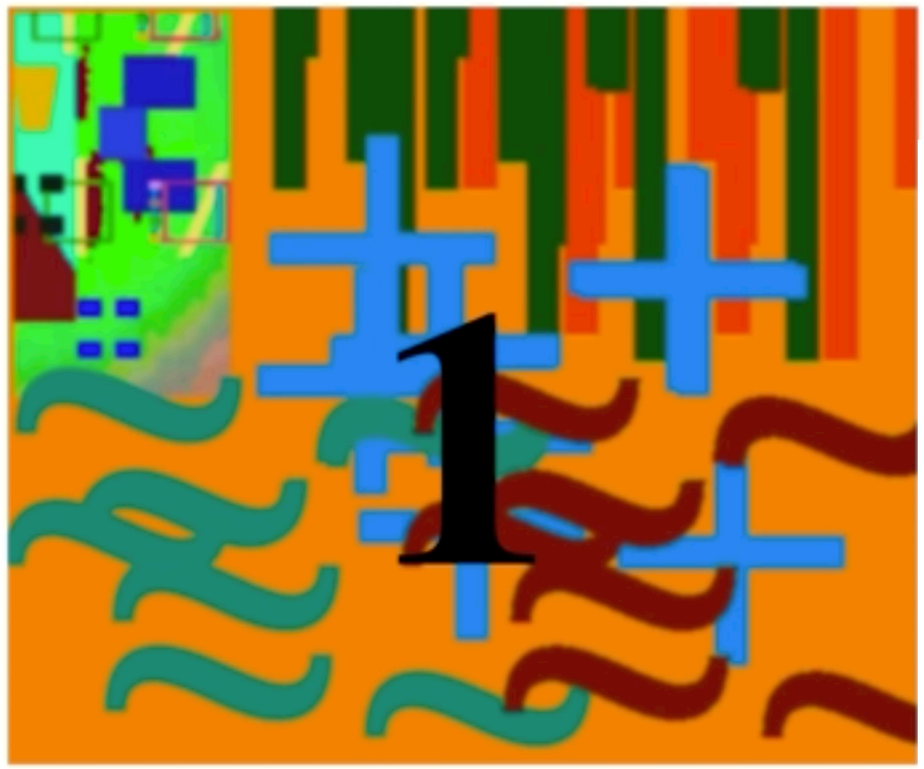

VOICE MEMOS

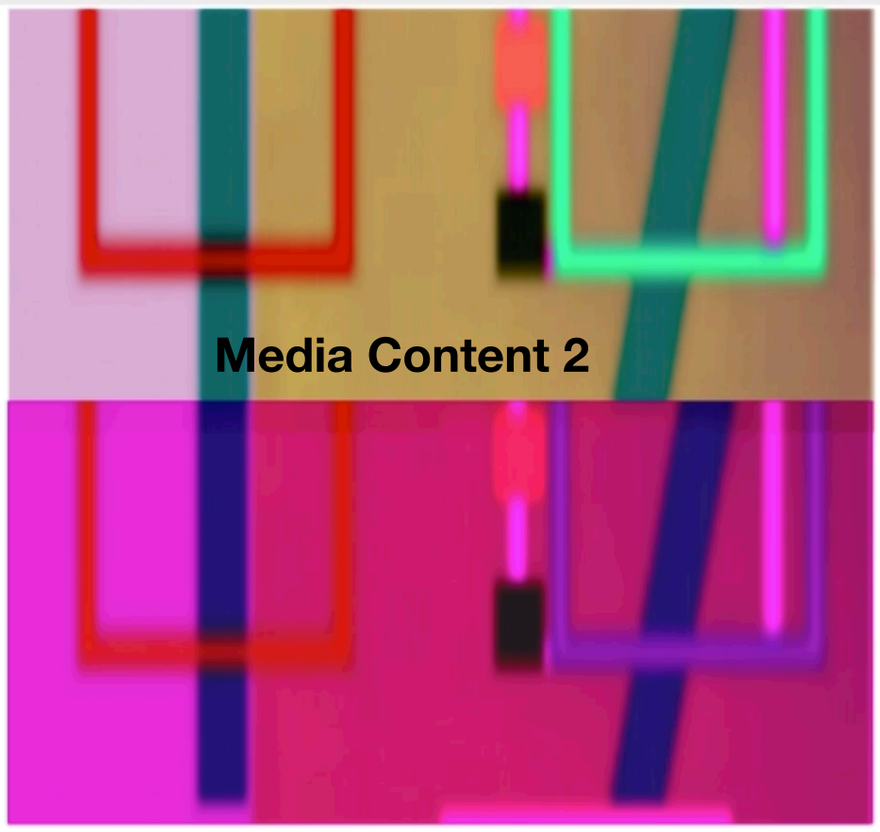
It allows recording (new voice, sound, beat), editing (replacement sound duration) and trimming audio samples.

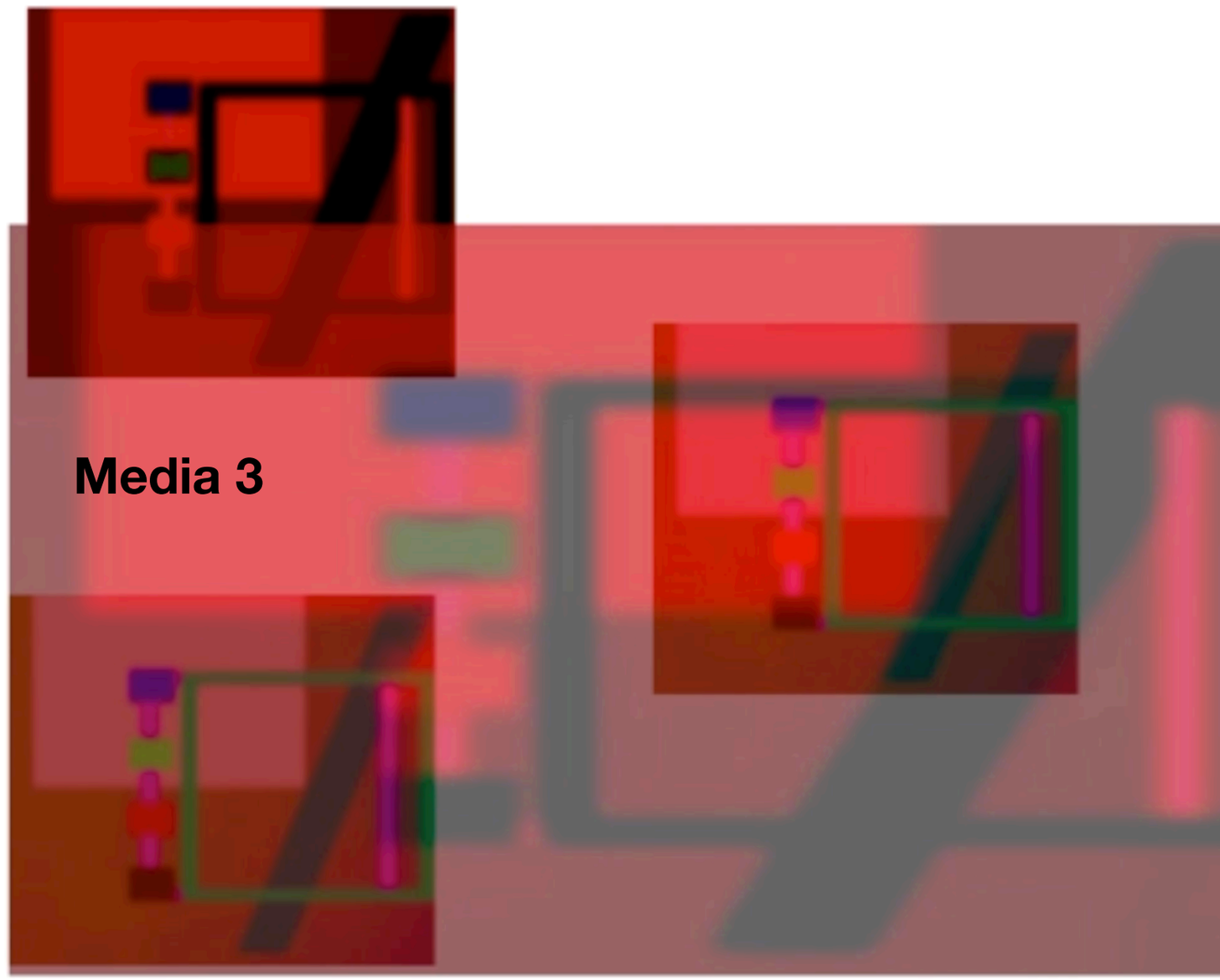
# 2. Media Content View.

2. Media Content View

# Percept

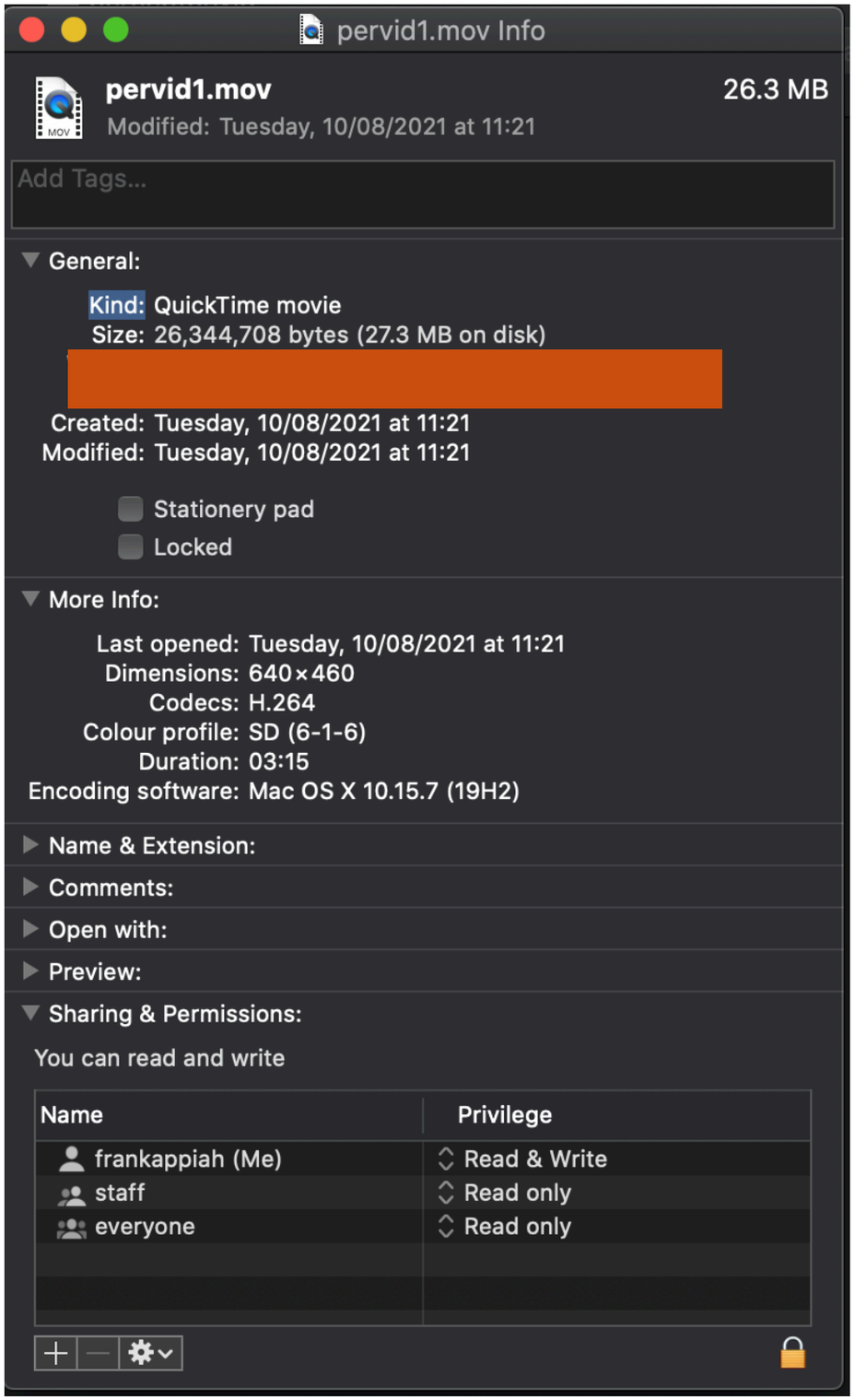


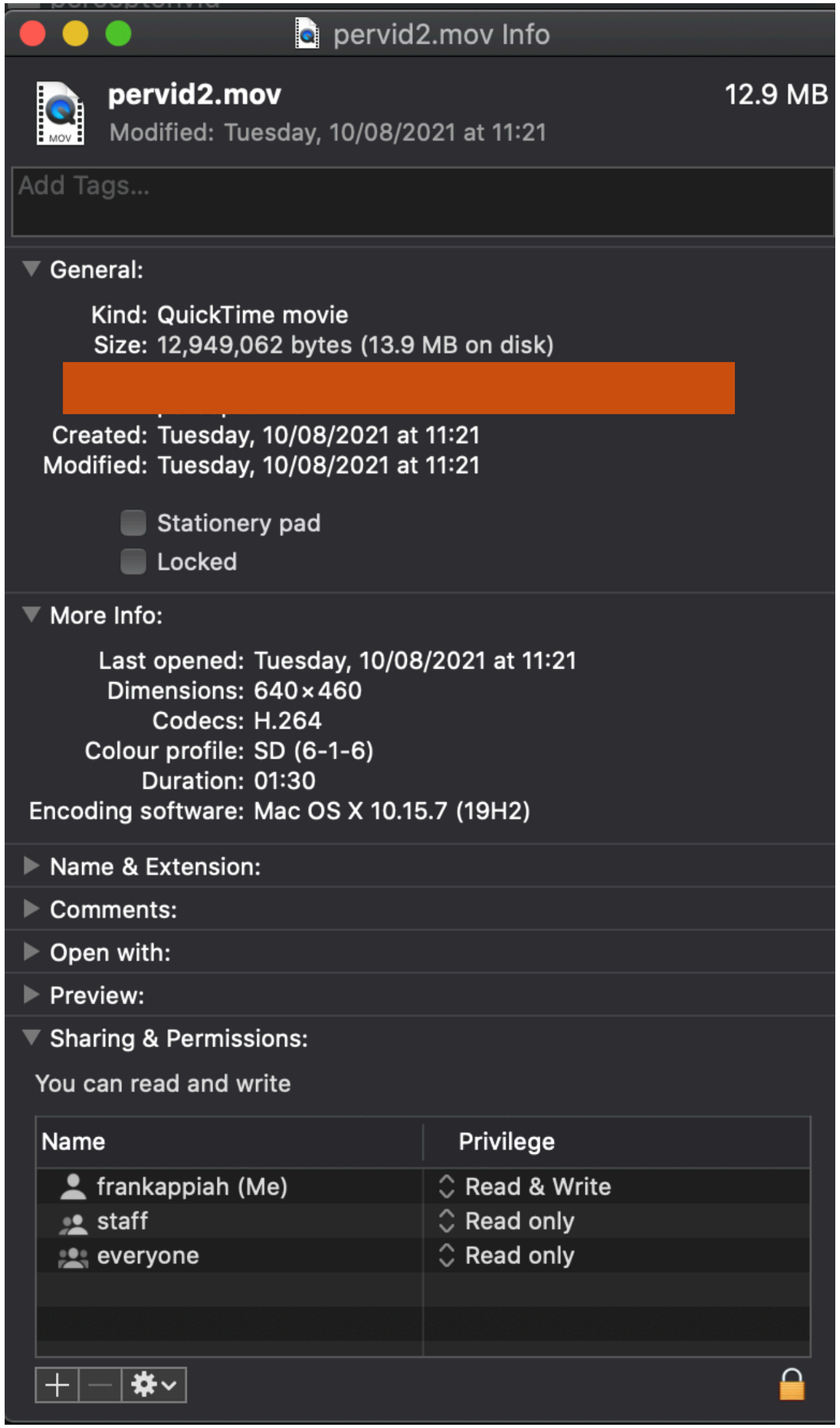



# Media Information on Content 1.

1. Look at the kind of file.
2. Look at the size of file.
3. Look at the creation date of file.
4. Look at the modification date of file.
5. Look at the dimensions of file.
6. Look at the codec of file.
7. Look at the colour profile of file.
8. Look at the media duration of file.
9. Look at the encoding software of file.
10. Look at the sharing and permissions of file.






**Media Information on Content 2.**

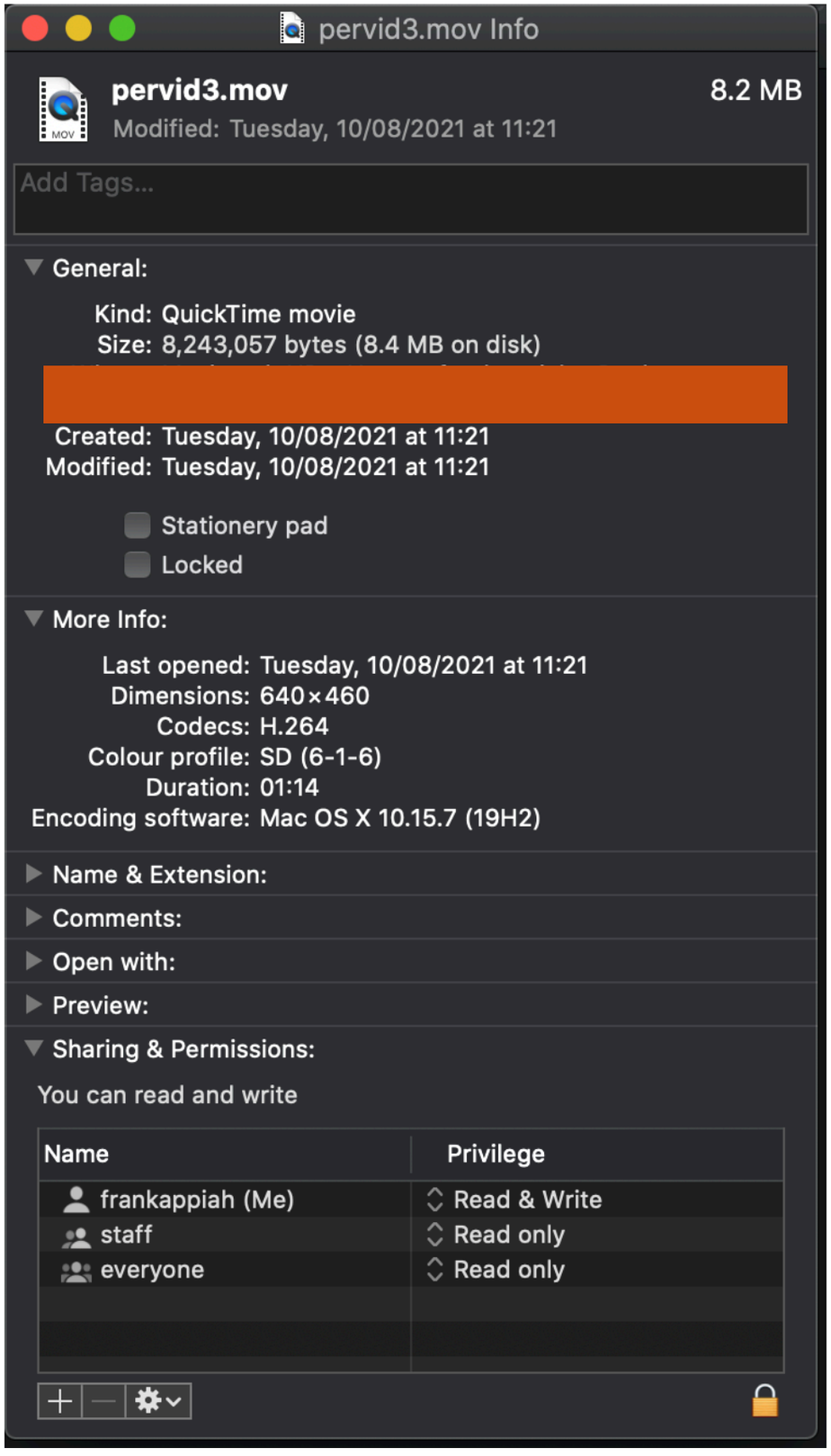
**Media 1 > Media 2**

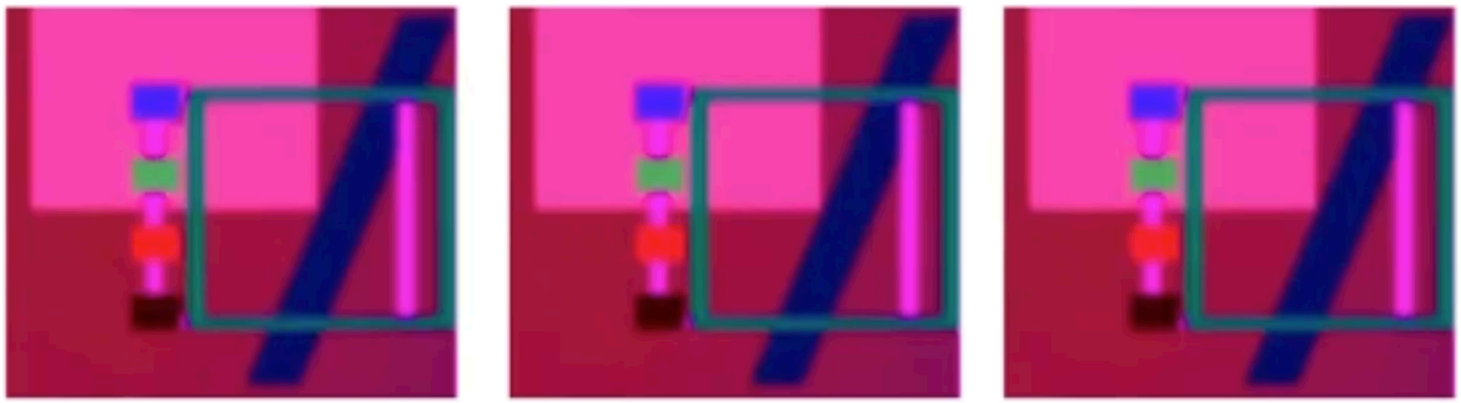
**26.3MB > 12.9MB.**

# Media Information on Content 3.

**Media 2 > Media 3**

**12.9MB > 8.2MB**





**Media 4**

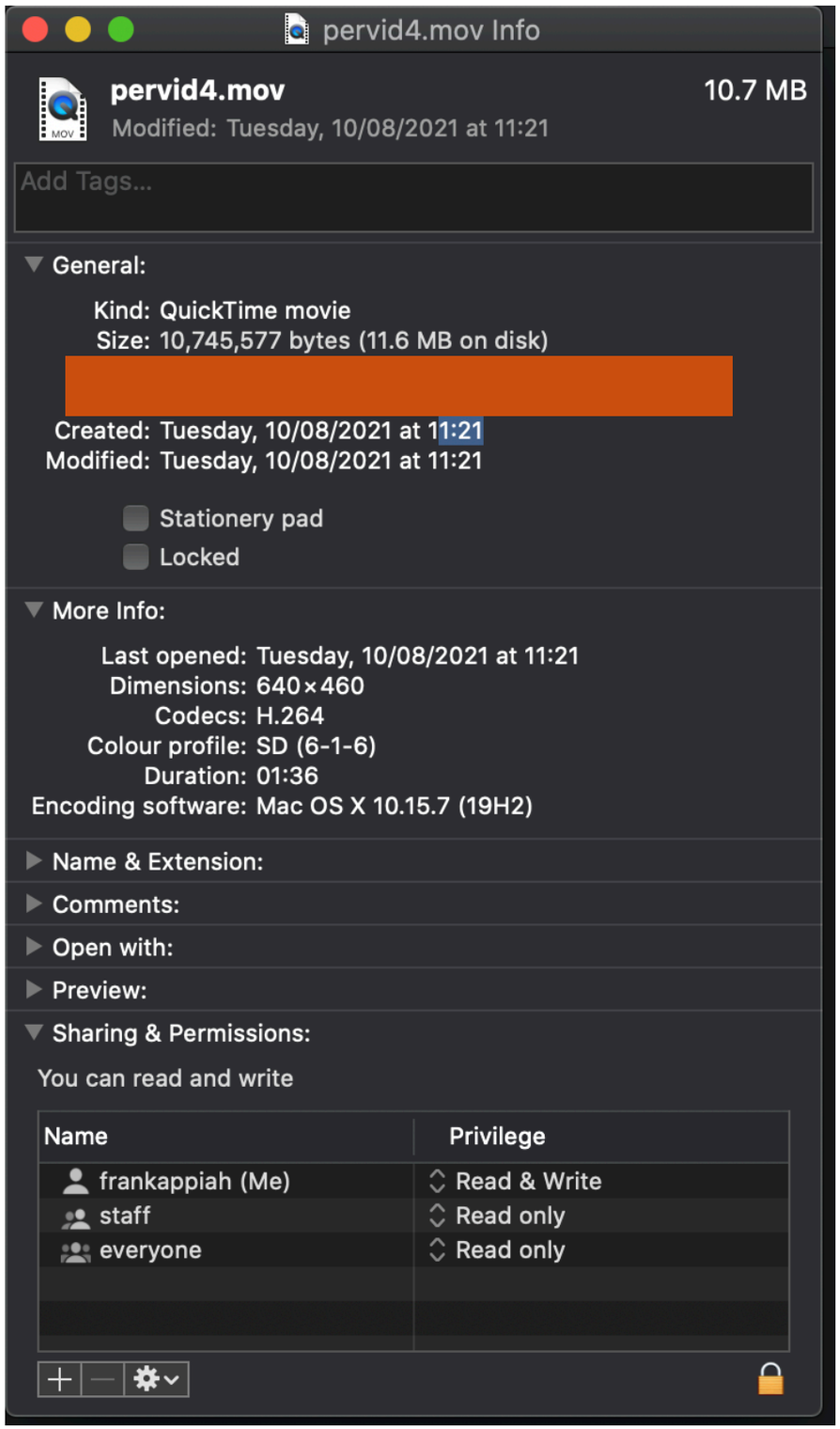
71

1- 10 Look Threads

# Media information 4.

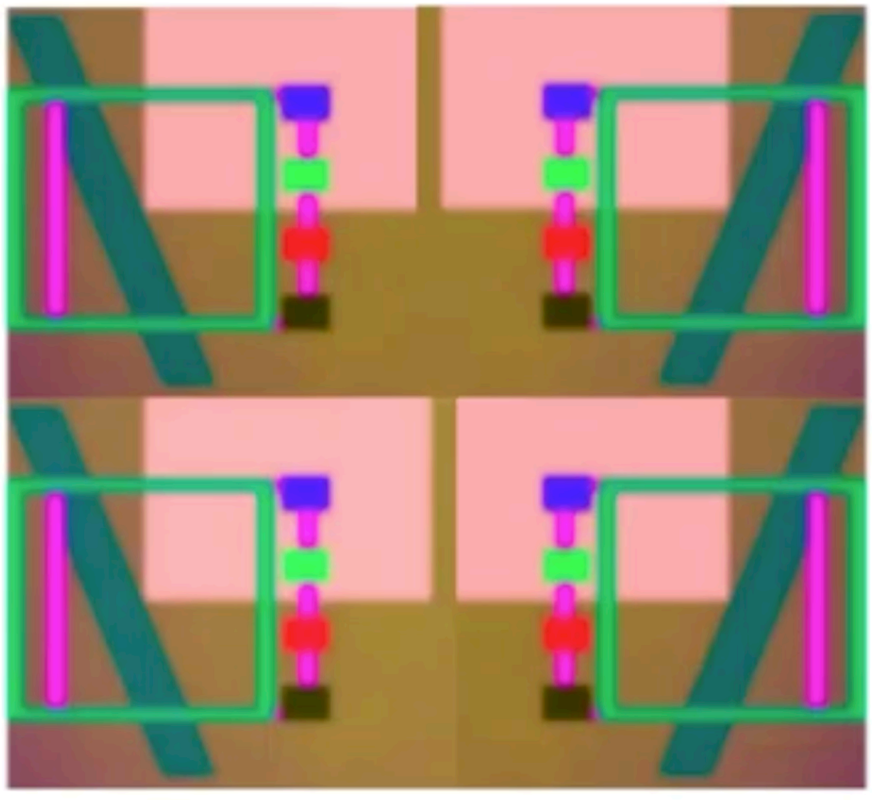
## Media 3 < Media 4

## 8.2MB < 10.7MB



Gamma=1.0

Media 5



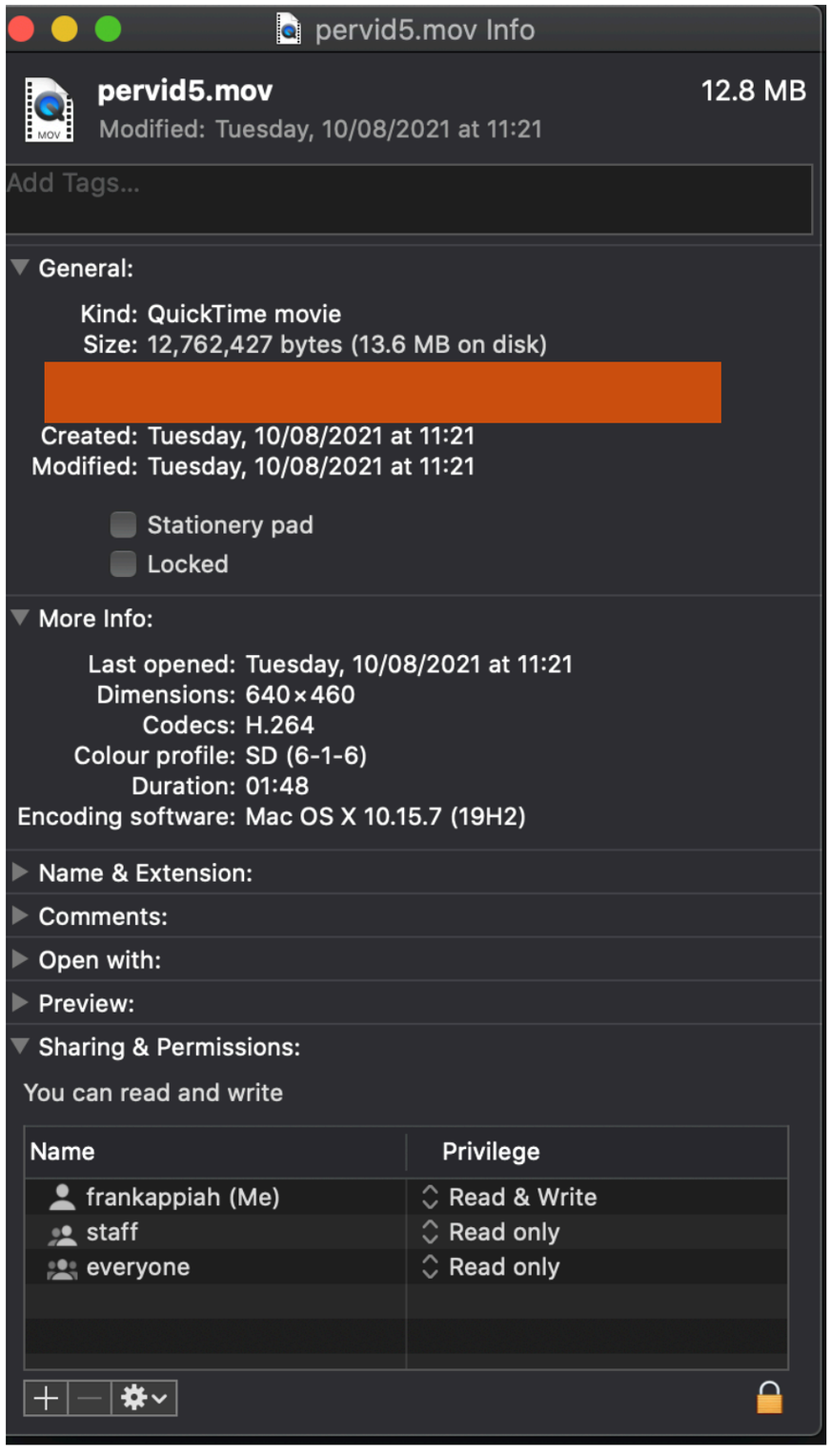
84

1- 10 Look Threads

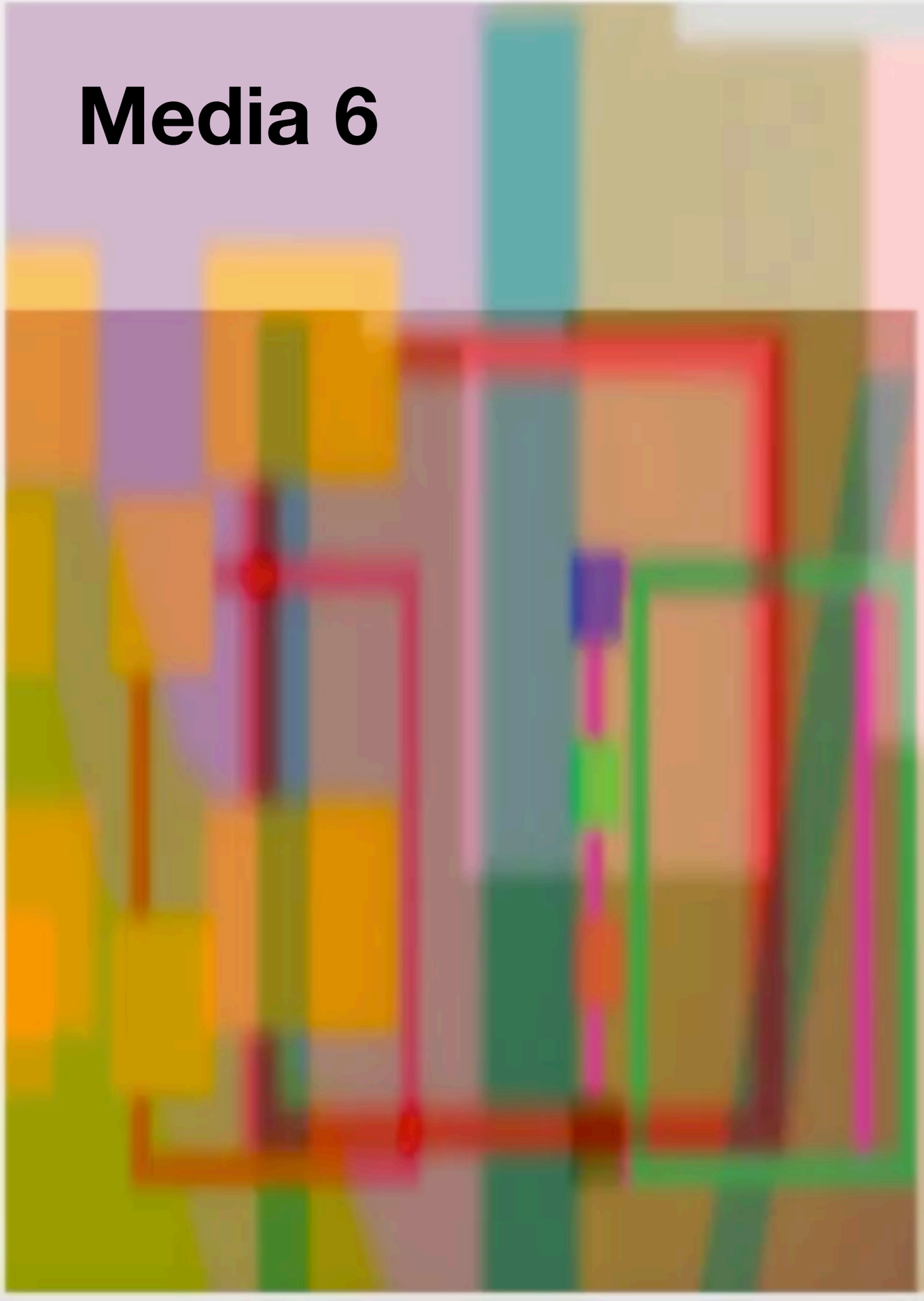
# Media information 5.

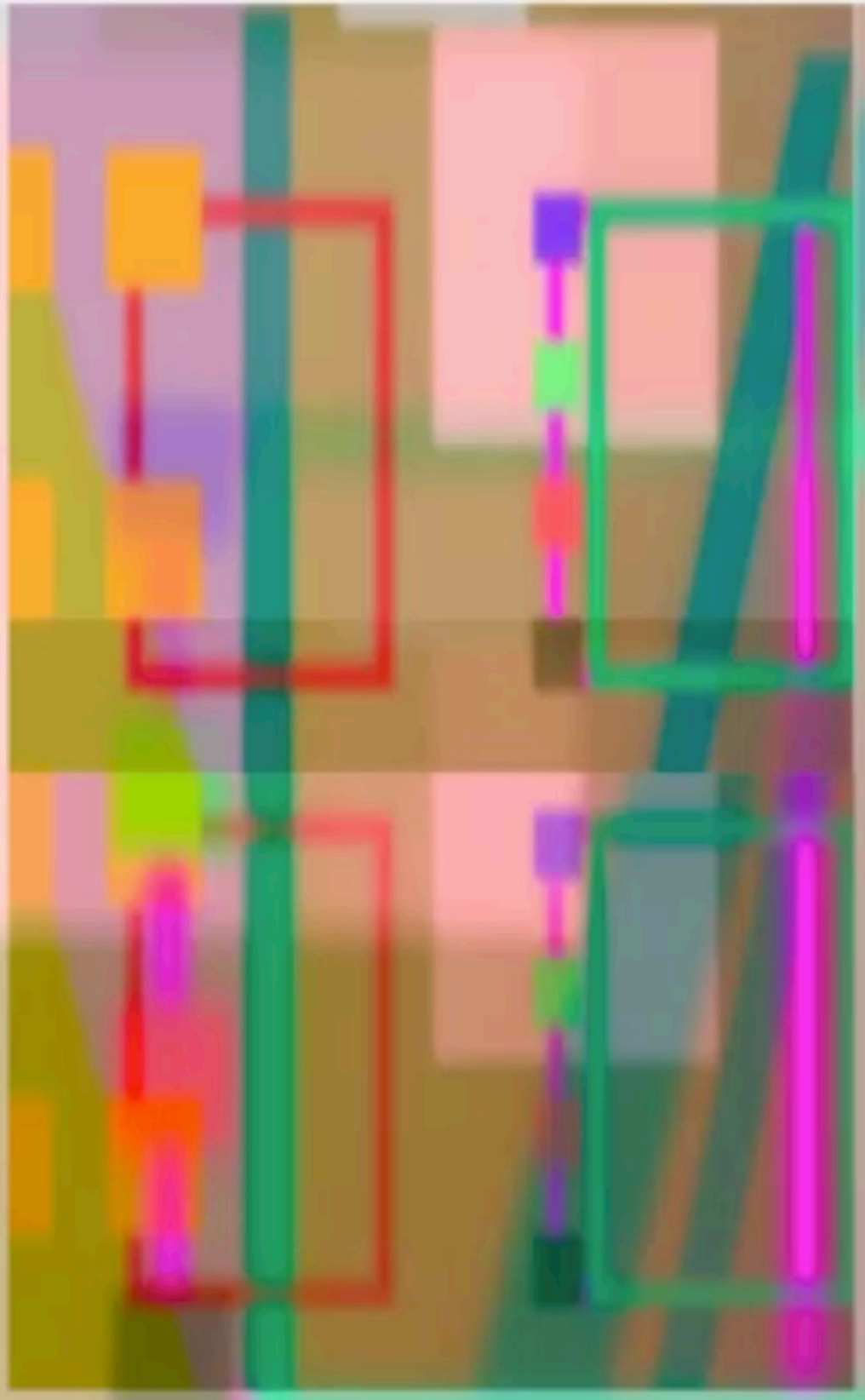
## Media 4 < Media 5

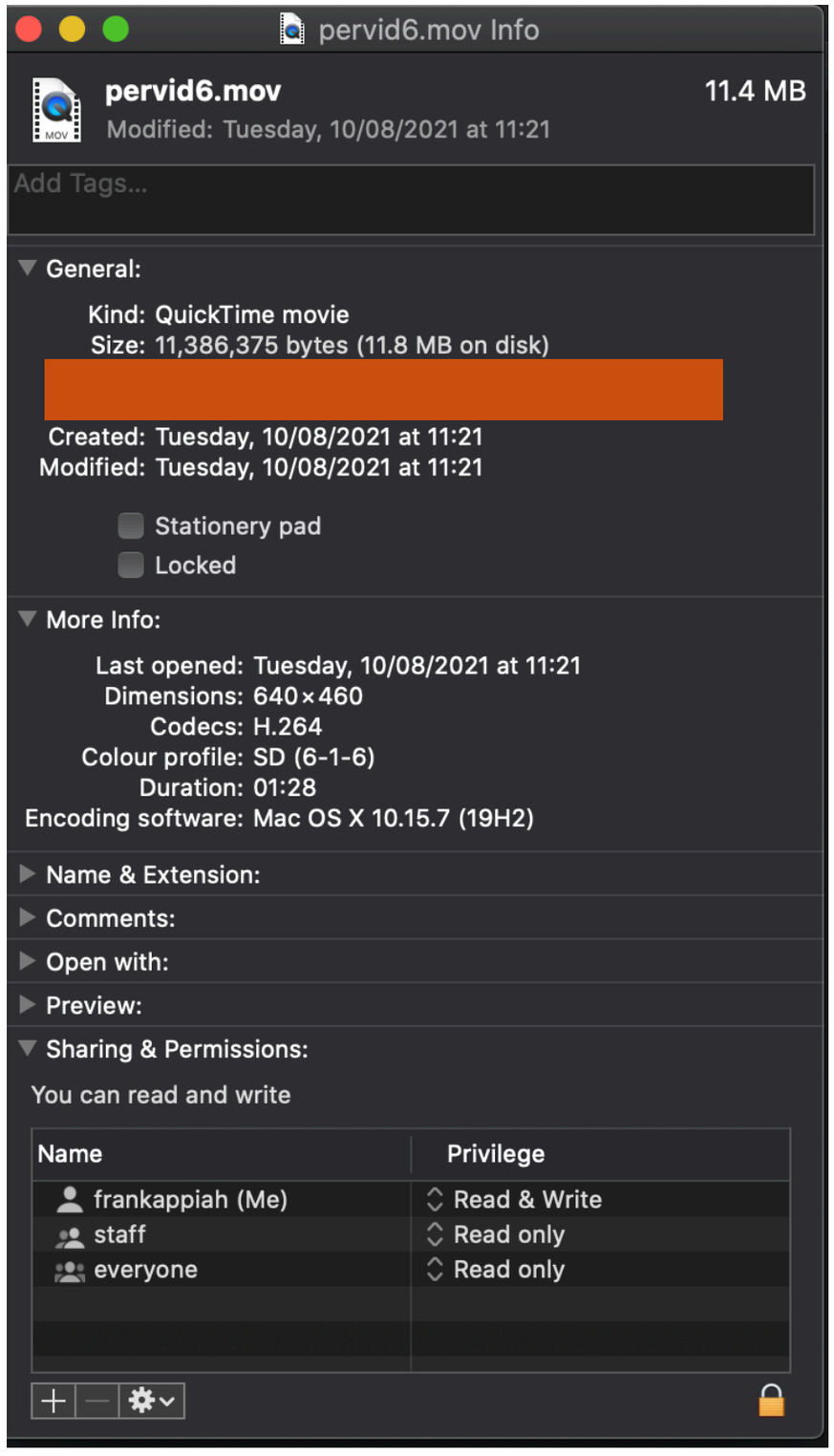
## 10.7MB < 12.8MB



# Media 6







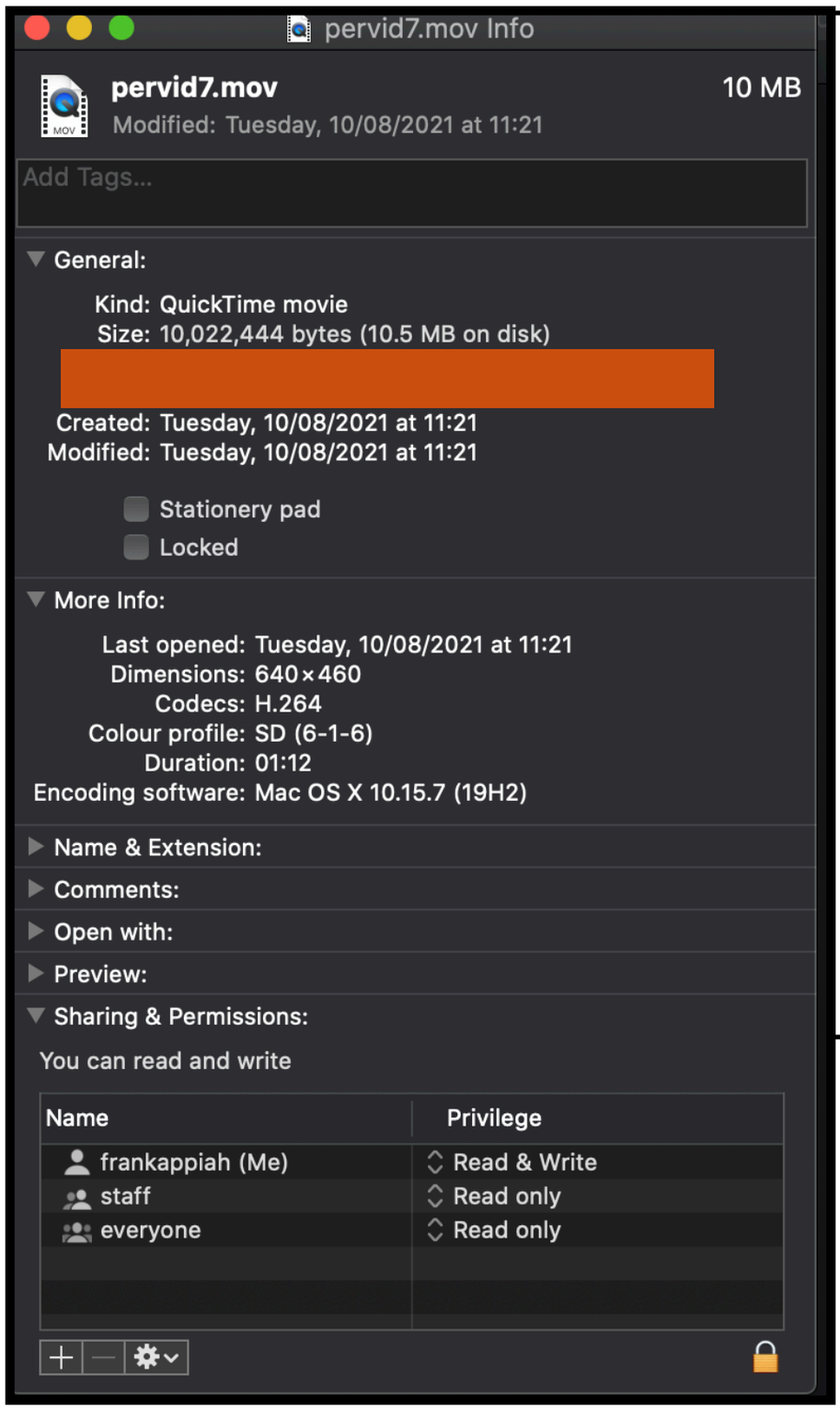

1- 10 Look Threads

# Media Information 6.

**Media 5 > Media 6**

**12.8MB > 11.4MB.**

# Media 7

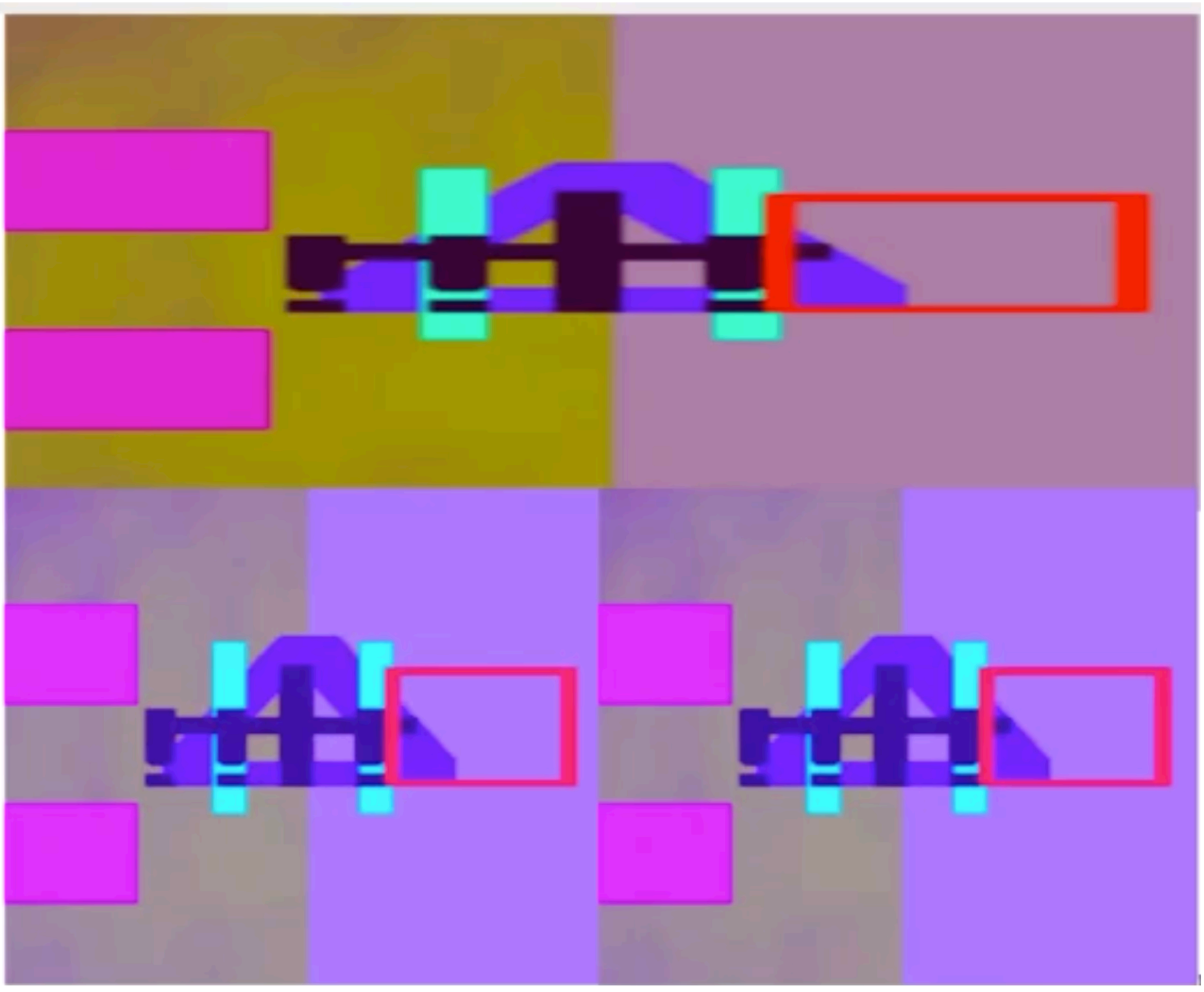



1- 10 Look Threads

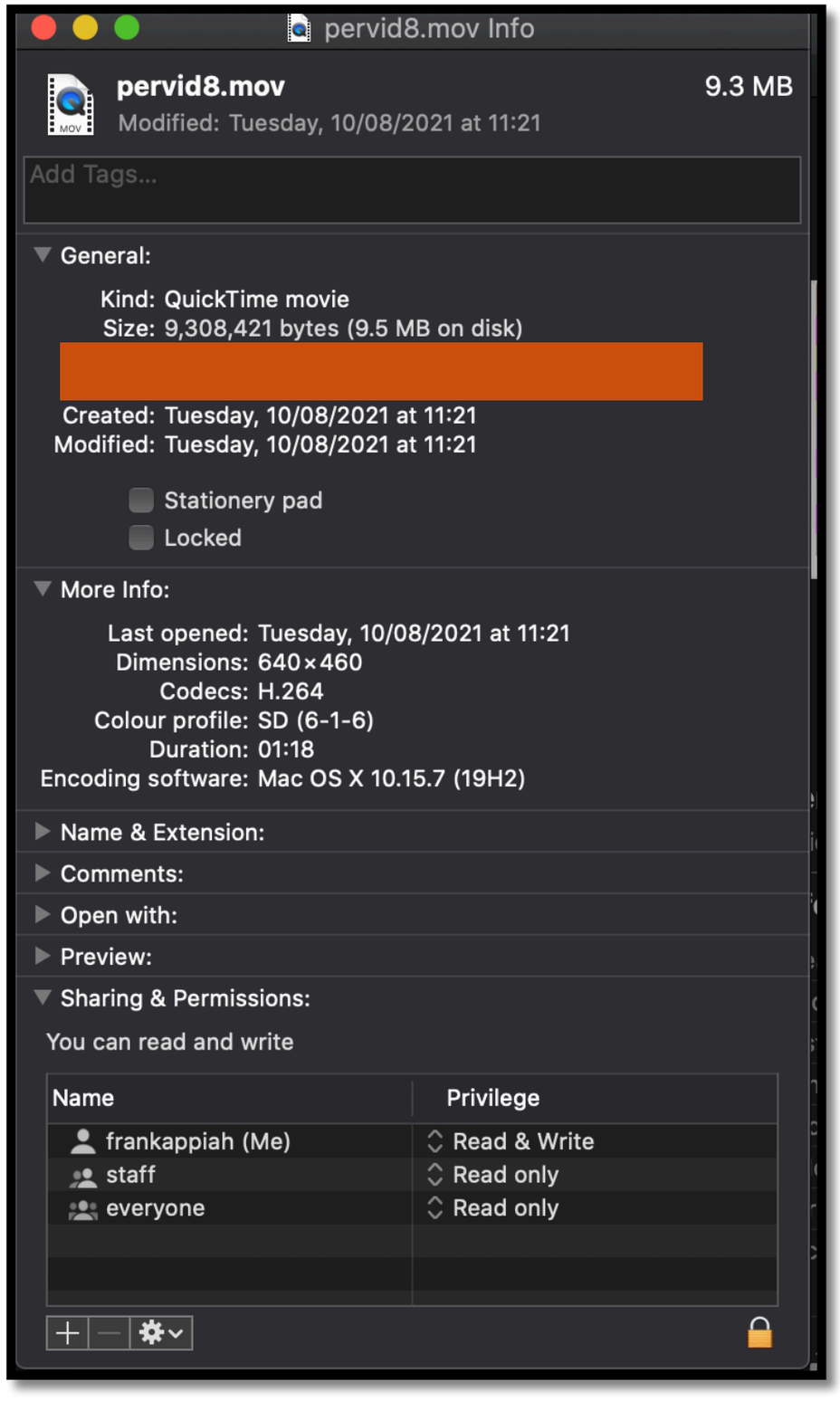
# Media Information 7.

**Media 6 > Media 7**

**11.4MB > 10MB.**



# Media 8

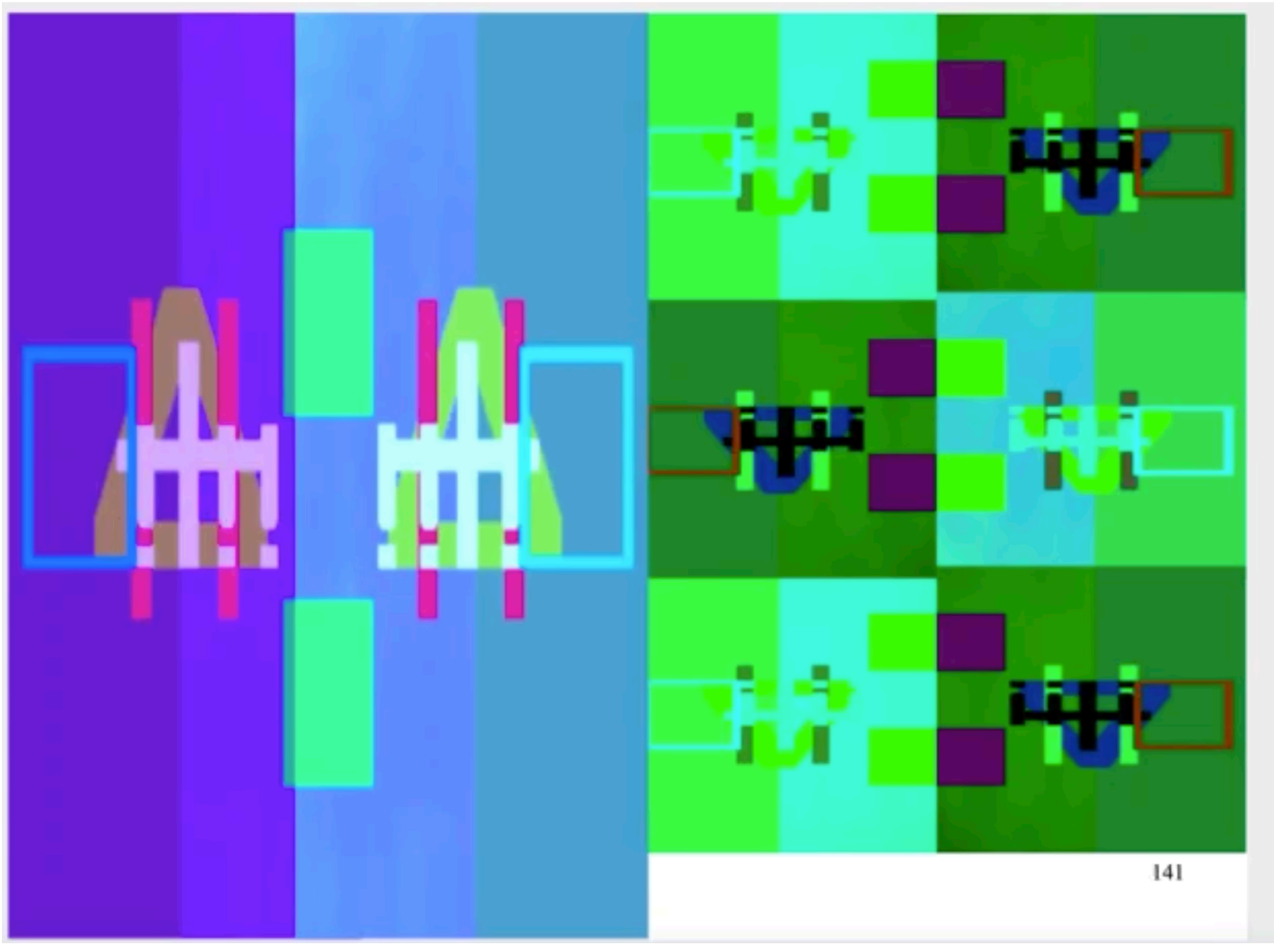


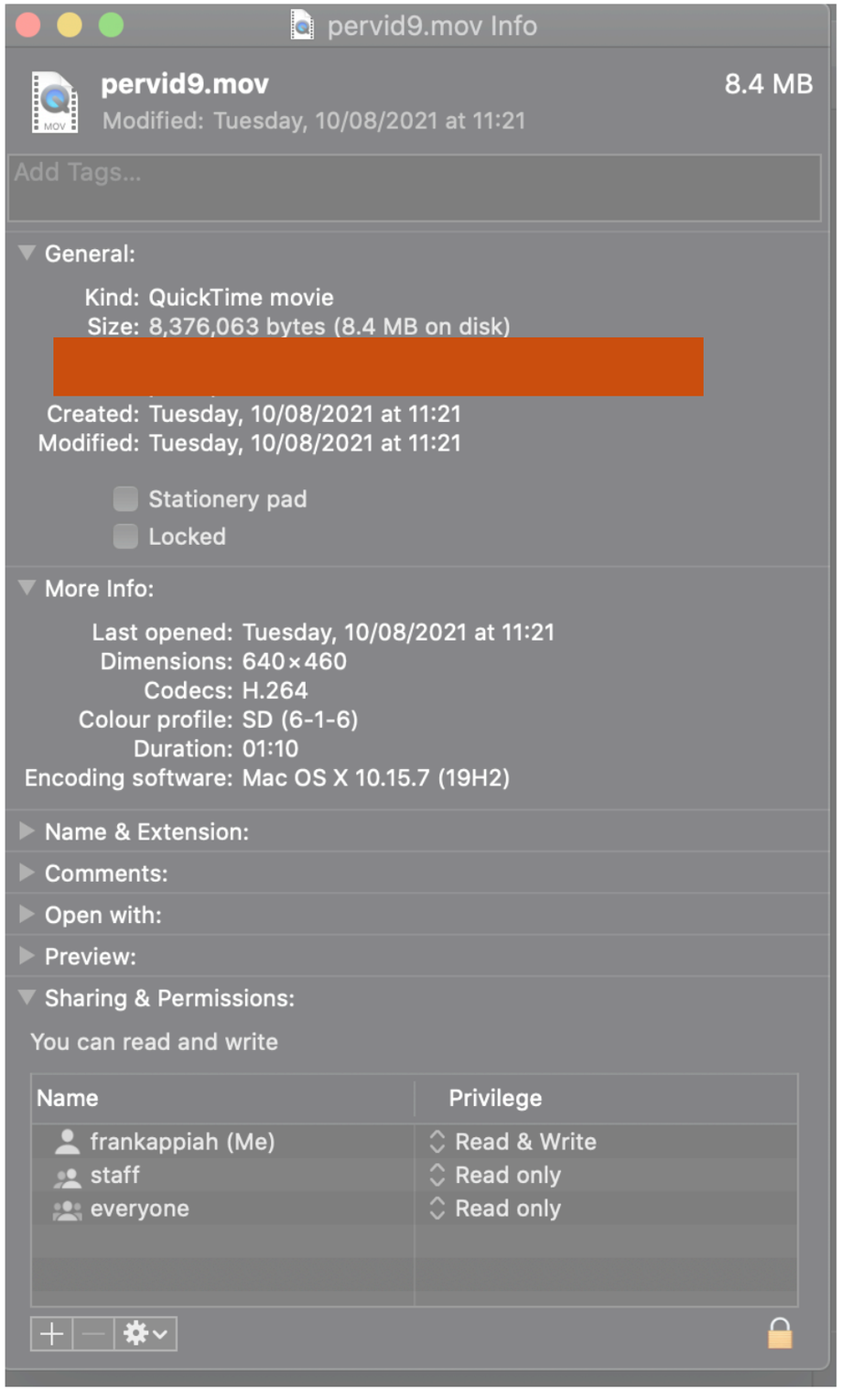

1- 10 Look Threads

# Media Information 8.

## Media 7 > Media 8

## 10MB > 9.3MB.


141




1- 10 Look Threads

# Media Information 9.

1- 10 Look Threads

# Metadata Information 9.

**Media 8 > Media 9**

**10MB > 8.4MB.**

These images captured from the video media were made from Perceptor Graphics Tool that I developed for a visual graphics perception. Perception made from large shapes of comma, dot, exclamation sign and more.

1. Content 1 have shapes comprising of plus, tilde, line, dot, trapezoid and more.

2. Content 2 have shapes comprising of hollow square, (slanted) line and filled squares.

3. Content 3 have shapes comprising of filled rectangle arranged vertically, hollow square, slanted lines and a background image.

4. Content 4 is perceived cuts into some of the media content. For this example perceived image is content 3.

5. Content 5 is made from arrangement in 2x2 form of content 4.

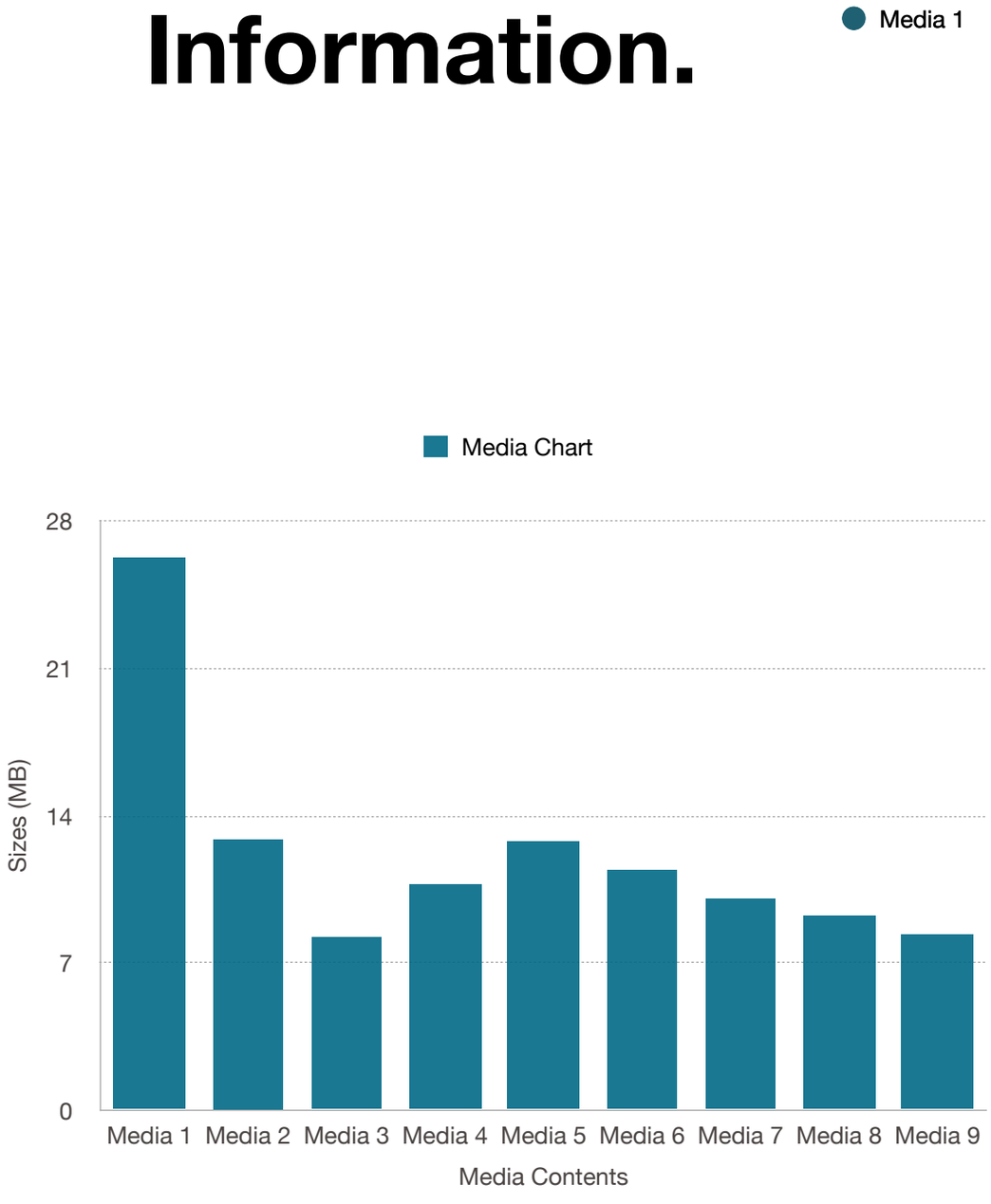
6. Content 6 is made from a replica of content 5 in addition to the previous content.

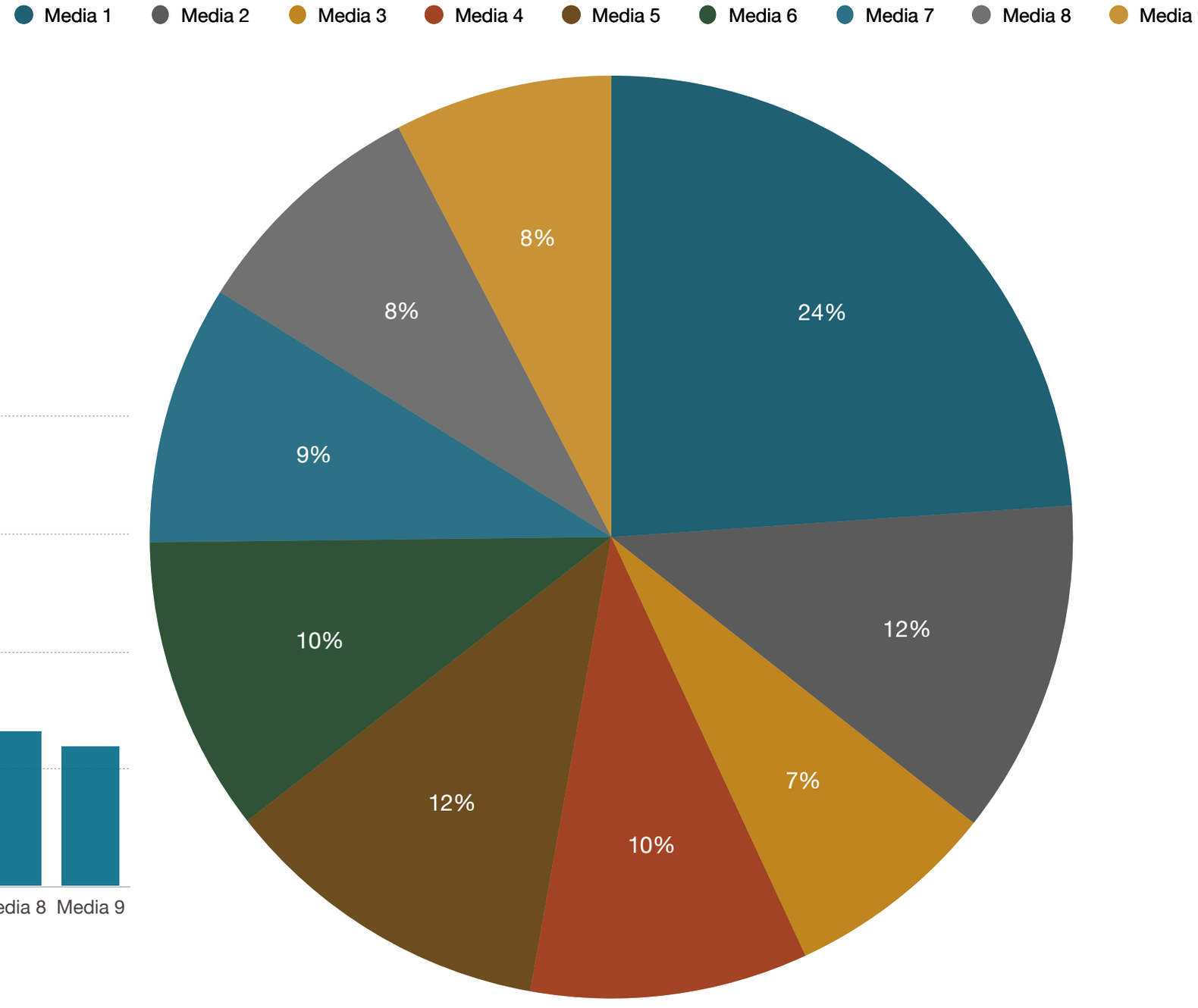
7. Content 7 is made from overlaid of three rectangle shapes, trapezoids, hollow rectangle with missing breath, etc.

8. Content 8 is made from a top view cut from a perceived content and placed a a two smaller joined content.

9. Content 9 is made from a left cut perceived image placed into three top layer arrangement.

# Media Disc Information.



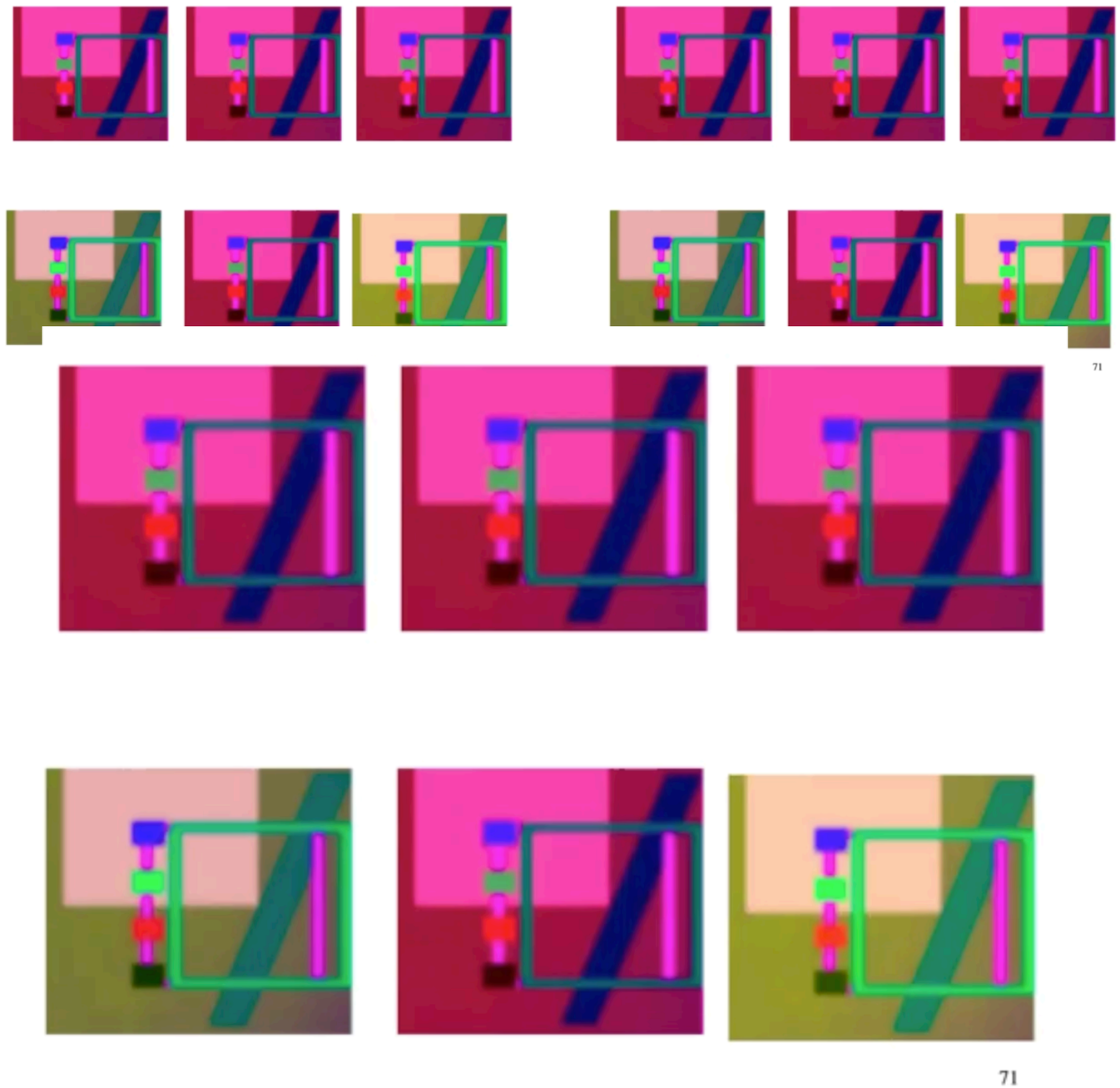

**Total Size: 110 MB**

## 3. Media Exchange View

# Media Exporting

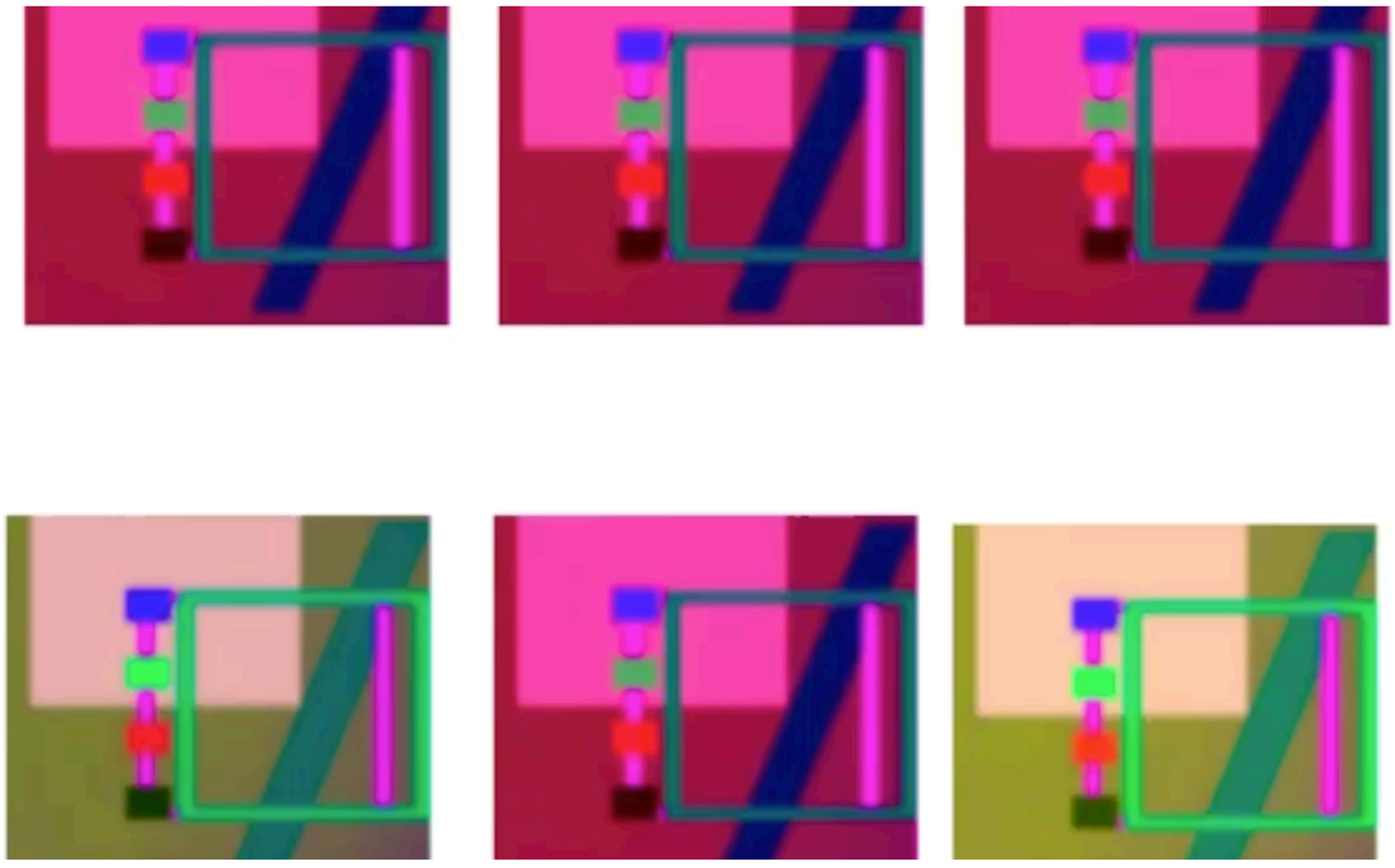
Media exchanging do happens when certain media file format is not supported by a device or PC. In such cases, one needs to export in order to exchange such file format.

We will go through with image exporting then to audio exporting and finally video exporting at the tool level.



PNG can be made by exporting a buffer image with certain kinds of shapes be it line, circle, rectangle, sphere, character and more to a format file ending as .png. Libpng in C++ can be used in making such software. My focus is on Java Imaging Library.

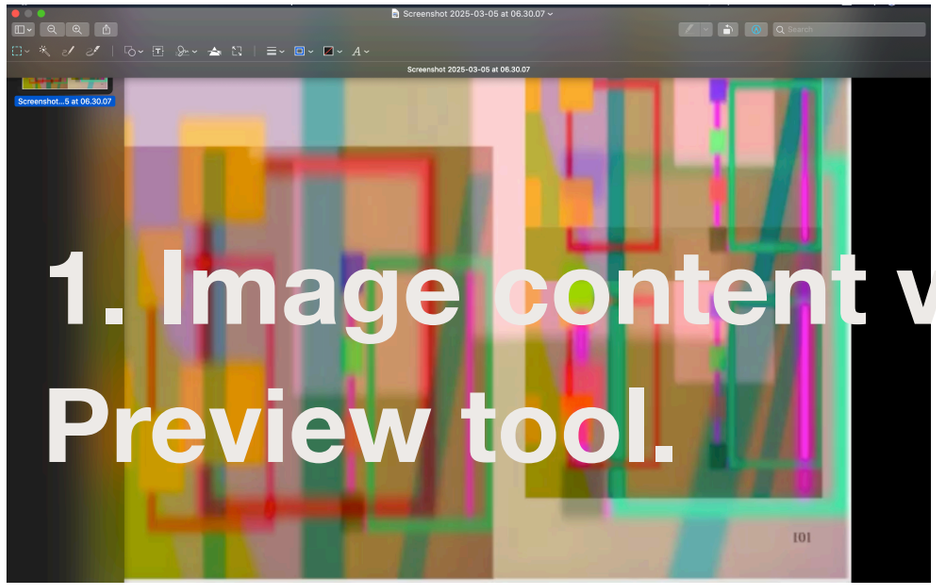
Here a buffferImage object has a *draw* function and allows drawing of shapes or polygons to create image content.
Gated view image above was made by my tool Perceptor.

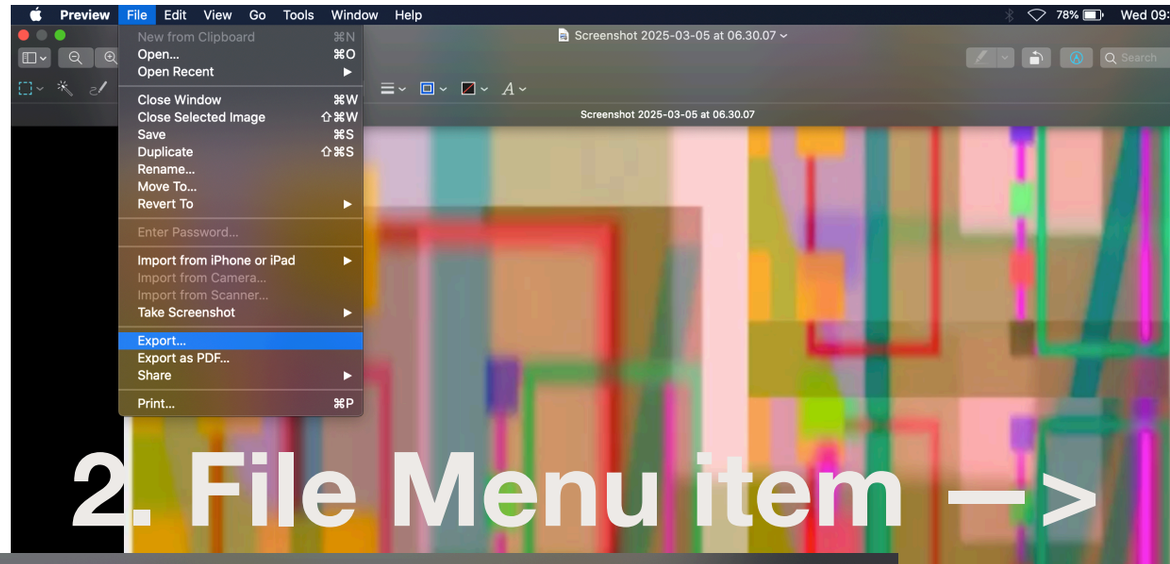


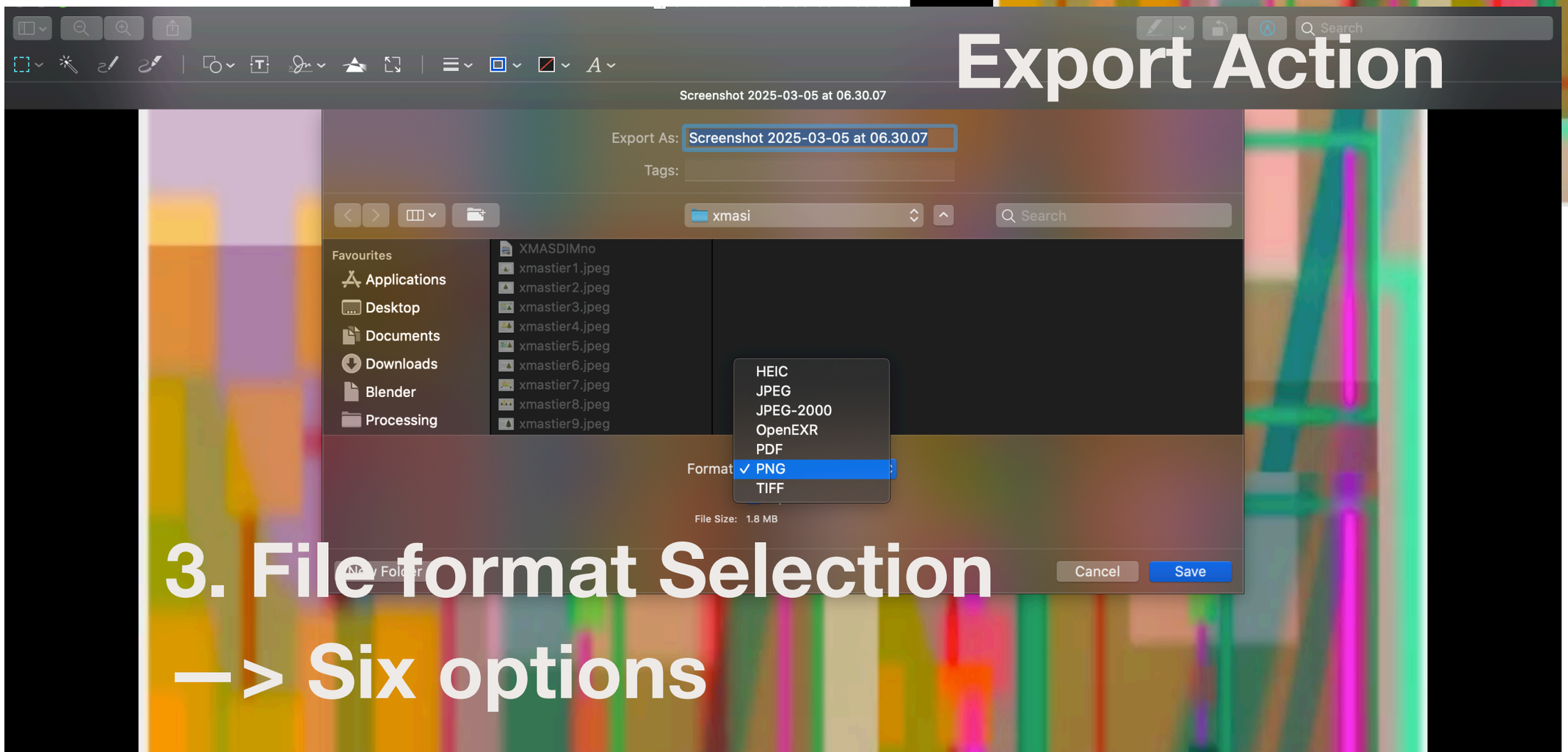
*Gated View*

In converting or exporting in a media exchange process, the discussion of such topic is made by a Preview tool on Mac but earlier text brought out other tools like GIMP, Inkscape, Microsoft Paint, etc.

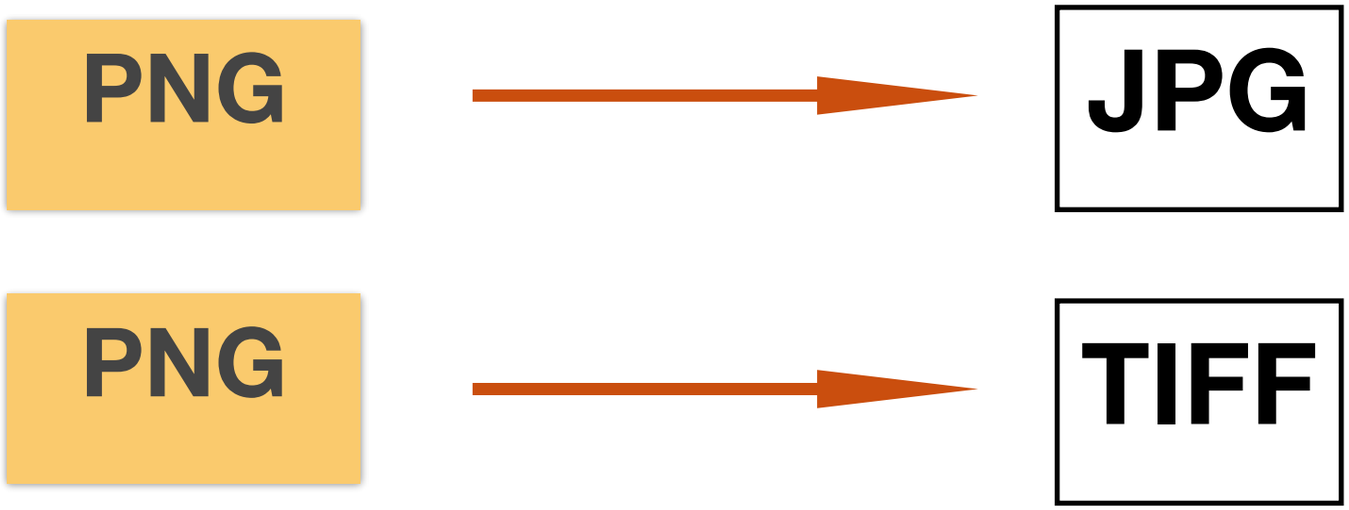
# Exporting PNG in Preview.


1. Image content view in
Preview tool.


Preview File Edit View Go Tools Window Help
New from Clipboard ⌘N
Open... ⌘O
Open Recent
Close Window ⌘W
Close Selected Image ⇧⌘W
Save ⌘S
Duplicate ⇧⌘S
Rename...
Move To...
Revert To
Enter Password...
Import from iPhone or iPad
Import from Camera...
Import from Scanner...
Take Screenshot
Export...
Export as PDF...
Share
Print... ⌘P
Screenshot 2025-03-05 at 06.30.07
2. File Menu item —>

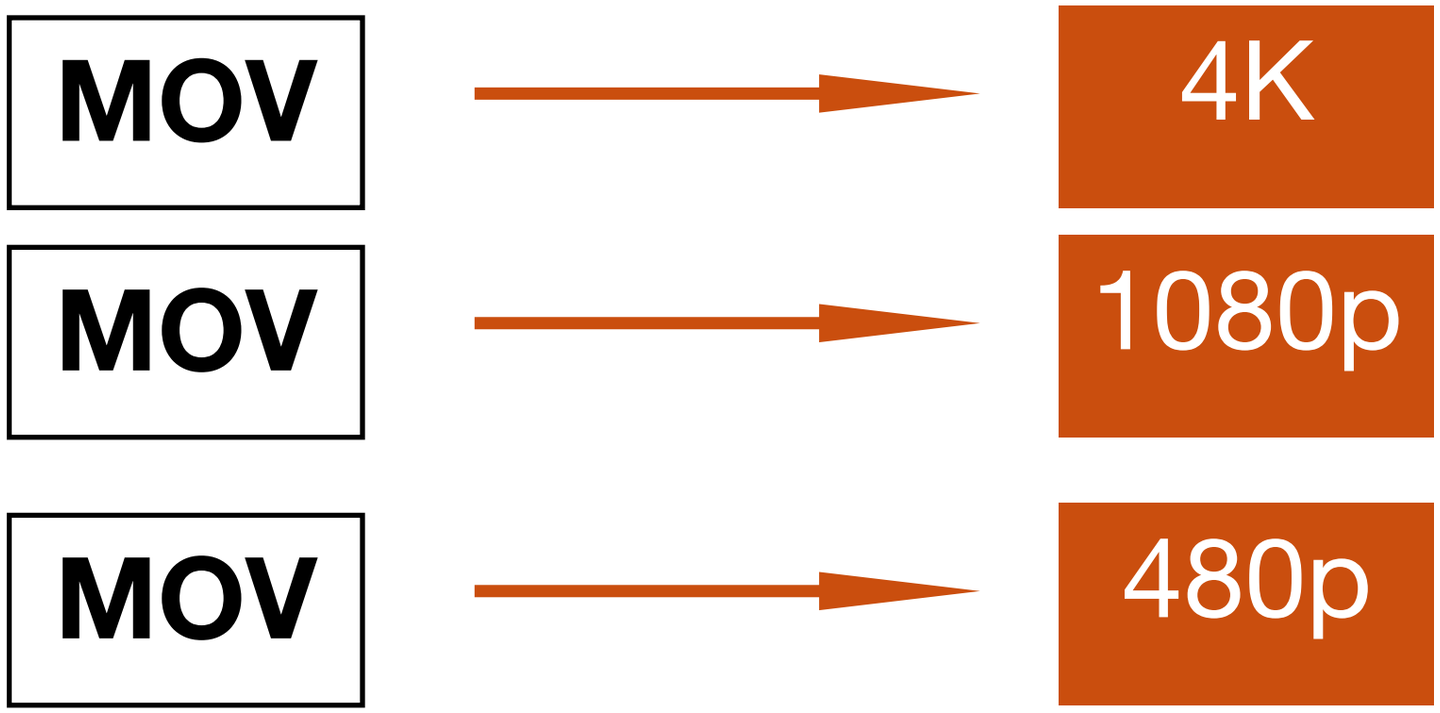

Export Action
Screenshot 2025-03-05 at 06.30.07
Export As: Screenshot 2025-03-05 at 06.30.07
Tags:
xmasi
Search
Favourites
Applications
Desktop
Documents
Downloads
Blender
Processing
XMASDIMno
xmastier1.jpeg
xmastier2.jpeg
xmastier3.jpeg
xmastier4.jpeg
xmastier5.jpeg
xmastier6.jpeg
xmastier7.jpeg
xmastier8.jpeg
xmastier9.jpeg
HEIC
JPEG
JPEG-2000
OpenEXR
PDF
PNG
TIFF
Format
File Size: 1.8 MB
New Folder
Cancel
Save
3. File format Selection
—> Six options

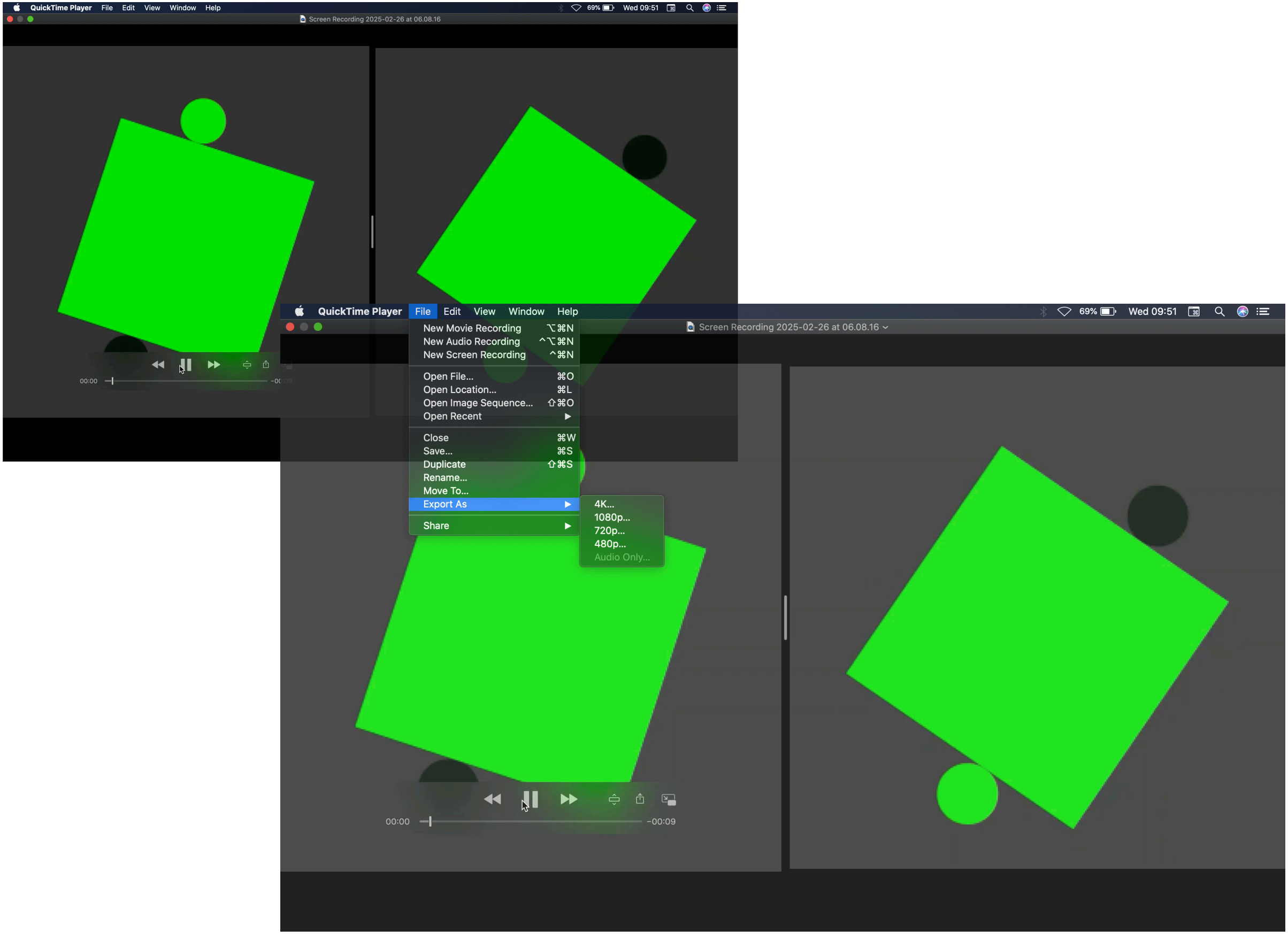
# Exporting PNG



This export does screen dimension conversion at the pixel level. It is done so as to reduce file size.

# Exporting MOV in QuickTime.




QuickTime Player
File
Edit
View
Window
Help
69%
Wed 09:51
Screen Recording 2025-02-26 at 06.08.16
New Movie Recording ⌥⌘N
New Audio Recording ^⌥⌘N
New Screen Recording ^⌘N
Open File... ⌘O
Open Location... ⌘L
Open Image Sequence... ⇧⌘O
Open Recent
Close ⌘W
Save... ⌘S
Duplicate ⇧⌘S
Rename...
Move To...
Export As
Share
4K...
1080p...
720p...
480p...
Audio Only...
00:00
-00:09

# CONCLUSION

This introduction was done on media information describing means of creating, acquiring and exchanging media formats alike. The question is “What kind of media production do you make?”. In answering this, it will bring you to the point of media information in daily dealing with a production stage of the media enterprise. Creating with drawing tool, acquiring by screen capturing tool and exchanging by media formats over media communication setup in general or in media browser. This is done all in the sense of computer media.